THE MARINE RECORD.

DEVOTED TO COMMERCE, ENGINEERING AND SCIENCE.

$2.00 PER YEAR. ESTABLISHED 1878. 10c. SINGLE COPY.

VOL. XVII. CLEVELAND, OHIO, OCTOBER 18, 1894. NO. 42

LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interest of Lake Carriers, and improve the character of the service rendered to the public.

PRESIDENT:

JAMES CORRIGAN, - - Cleveland, Ohio.

SECRETARY:

CHARLES H. KEEP, - - Buffalo, N. Y.

TREASURER:

GEORGE P. MCKAY, - Cleveland, Ohio.

COUNSEL:

HARVEY D. GOULDER, - Cleveland, Ohio.

VICE PRESIDENTS:

E. M. PECK,	Detroit.	GEORGE G. HADLEY,	Toledo.
WASHINGTON BULLARD,	Buffalo.	H. A. HAWGOOD,	Cleveland.
J. S. DUNHAM,	Chicago.	JAMES MCBRIER,	Erie.
A. B. WOLVIN,	Duluth.	DAVID VANCE,	Milwaukee.
C. A. EDDY,	Bay City.	F. J. FIRTH,	Philadelphia.

COMMITTEE ON FINANCE:

H. M. Hanna,	Cleveland, Ohio.	D. C. Whitney,	Detroit, Mich.
H. H. Brown.	Cleveland, Ohio.	W. P. Henry,	Buffalo, N. Y.
James Corrigan,	Cleveland, Ohio.	J. H. Brown,	Buffalo, N. Y.
H. A. Hawgood,	Cleveland, Ohio.	David Vance,	Milwaukee, Wis.
Thomas Wilson,	Cleveland, Ohio.	R. P. Fitzgerald,	Milwaukee, Wis.
M. A. Bradley,	Cleveland, Ohio.	John G. Keith,	Chicago, Ill.
J. C. Gilchrist,	Cleveland, Ohio.	J. S. Dunham,	Chicago, Ill.
E. M. Peck,	Detroit, Mich.		

COMMITTEE ON AIDS TO NAVIGATION:

David C. Carter,	Detroit, Mich.	W. M. Egan,	Chicago, Ill.
H. S. Hodge,	Detroit, Mich.	Frank Owen,	Ogdensburg, N. Y.
George P. McKay,	Cleveland, Ohio.	A. W. Colton,	Toledo, Ohio.
H. G. Dalton,	Cleveland, Ohio.	James Davidson,	Bay City, Mich.
B. L. Pennington,	Cleveland, Ohio.	Alvin Neal,	Port Huron, Mich.
W. C. Richardson,	Cleveland, Ohio.	E. T. Evans,	Buffalo, N. Y.
Thomas Wilson,	Cleveland, Ohio.	Washington Bullard,	Buffalo, N. Y.
John W. Moore,	Cleveland, Ohio.		

COMMITTEE ON LEGISLATION:

S. D. Caldwell,	Buffalo, N. Y.	Wm. Livingstone, Jr.,	Detroit, Mich.
James Ash,	Buffalo, N. Y.	James Millen,	Detroit, Mich.
E. T. Evans,	Buffalo, N. Y.	Jesse Spaulding,	Chicago, Ill.
P. P. Miller,	Buffalo. N. Y.	C. A. Eddy,	Bay City, Mich.
John Gordon,	Buffalo, N. Y.	Alex. McDougall,	Duluth, Minn.
Wash. Bullard,	Buffalo, N. Y.	W. S. Brainard,	Toledo, Ohio.
H. M. Hanna,	Cleveland, Ohio.	F. J. Firth,	Philadelphia, Pa.
James Corrigan,	Cleveland, Ohio.		

COMMITTEE ON INSURANCE:

W. S Mack,	Cleveland, Ohio.	John Rice,	Buffalo, N. Y.
H. A. Hawgood,	Cleveland, Ohio.	Edward Smith,	Buffalo, N. Y.
J. C. Gilchrist,	Cleveland, Ohio.	W. S. Brainard,	Toledo, Ohio.
J. T. Hutchinson,	Cleveland, Ohio.	W. M. Egan,	Chicago, Ill.
A. A. Parker,	Detroit, Mich.		

UNITED STATES BOUNDARY.

The statement published that Mount St. Elias, in Alaska, which has always been held to be in United States territory, had been found to be outside of the boundary line, and therefore belonging to the Dominion of Canada, is stated to be at least premature and made without authority of any one in possession of the facts. The computations have not been made, and until this is done the surveyors will not make any statement on the subject. The officers say that until the present season's work has been completed no authentic details can be presented on which to base any calculation.

The results of the work will enable the survey to make the intersections of the boundary line between Alaska and British Columbia, with all the principal inlets and rivers, and determine the location of the principal mountains from the Portland Canal to the 141st meridian.

The other boundary in controversy is the water line between Maine and New Brunswick, formed by the St. Croix River. This river bounds the easternmost limit of the United States, Eastport, Me., being on its banks near where it enters the sea. The boundary, which is an imaginary line, follows the course of the stream, meandering in and out among the islands that are found near the mouth of the St. Croix, and in the Atlantic near the mainland. Just where the line is in certain parts has for a long time been an open question, and the fixed determination of the line and its marking by fixed buoys is the object of these surveys. There will be some change in the boundary, but not of special importance. One island, known as Pope's Folly, which is claimed by New Brunswick, has been located west of the boundary and inside the State limits of Maine. It is a small islet—a mere rock, indeed—and from either a commercial or a strategic standpoint is worthless.

After these several surveying parties have compiled the results of their observations, the whole work will be arranged by the United States survey and turned over to two commissioners, one on the part of each government. If they can agree, they will determine the proper line, based upon the surveys down the St. Croix and between Alaska and British Columbia. This done, they will report to their respective governments, and the boundaries will be forever fixed by definite metes and bounds marked by indestructible landmarks. The commissioners cannot possibly complete their task short of another year's work.

LONG TRIP IN A BOAT.

Ed. Viall and J. W. Barnum, of Oshkosh, Wis., have adopted a novel way of enjoying a trip to New Orleans. They have had built a nice staunch little boat with cabin and all the necessaries for a long outing. They left Oshkosh September 27, went up the Fox River to Portage and thence down the Wisconsin River to Prairie du Chien, where they now are on their way to New Orleans.

THE CRUISER OLYMPIA.

The United States Naval Department's efforts towards increasing the force in Chinese waters has resulted in the hurried completion of the 5,800 ton cruiser Olympia which will be soon delivered at Mare Island to the government, and as early as her complement of 460 sailors, marines, and officers can be provided, will be dispatched to the scene of the conflict. The Olympia is the crack cruiser of the United States Navy, and will cost the government over $2,000,000 when completed.

WEATHER FORECASTS.

Through the efforts of the local forecast official at Cleveland it is now a serious offense to publish false or counterfeit weather forecasts or warnings, as the appended paragraph from an act of congress approved Aug. 8 of this year shows:

"Any person who shall knowingly issue or publish any counterfeit weather forecasts or warnings of weather conditions, falsely representing such forecasts or warning to have been issued or published by the Weather Bureau, United States Signal Service or other branch of the government service, shall be deemed guilty of a misdemeanor and on conviction thereof, for each offense, be fined in a sum not exceeding $500 or imprisoned not to exceed ninety days, or be both fined and imprisoned in the discretion of the court."

A QUESTION OF JURISDICTION.

A case which presents a question never before adjudicated was argued at the United States Court at Duluth on Tuesday. The point involved is whether a writ of attachment issued from a federal court in one State can be served at a point 400 miles distant in another State. Early the present season the small passenger ferry steamer Lindrup left Superior Bay for Manistique, Mich., while papers for her seizure to satisfy unpaid claims were being perfected. The United States marshal started in pursuit with a tug, but as the latter had only a limited fuel supply, she was compelled to return after having made a short run down Lake Superior. Another start was made after the coal bunkers had been replenished, and the pursuit kept up as far as Sault Ste. Marie, where the Lindrup was overhauled, attached and towed back to Duluth. The owner raised the question of jurisdiction, secured a stay of proceedings and carried the matter into the United States District Court, where arguments have been heard and a decision may soon be reached. M. C. Krause, of Milwaukee, appeared for the owner of the Lindrup, who, in the event of a decision in his favor, will begin proceedings to recover damages from the Minnesota United States marshal for the unlawful detention of his property and the loss of revenue resulting therefrom.

A PREMATURE ABANDONMENT.

A case of premature abandonment is telegraphed this week from Halifax, N. S. It appears that the schooner Lord Eldon left Halifax last Saturday afternoon for Guysboro with a general cargo, and in going around Canso Sunday morning ran on to a reef. As she was evidently in a very bad position and with the high seas running, the crew launched a small boat and all hands succeeded in getting into her.

In the meantime the vessel pounded on the reef, the rudder was unshipped and she was evidently fast becoming a total wreck, but the crew had hardly got clear of her when she fell off the ledge; her mainsail filled and she started off for sea without a soul aboard, her sails set and with her rudder gone.

The schooner Diamond came in sight, bore down, and took the crew on board, and on explaining matters she started after the runaway, though the wind was increasing and the sea very heavy. They finally got up alongside her, and launched a boat for the crew to go on board, but the heavy sea smashed the boat and they could not board her.

The sea had grown so heavy that it was doubtful if a small boat could live through it, and it was decided to keep the Lord Eldon in sight, and when the wind and sea moderated the crew would make another attempt. The wind, however, kept increasing during the day and throughout the night, and it was decided, when darkness came on, to lay to until morning.

The next day broke fine and clear, they made sail and ran twenty miles in the direction the Lord Eldon was last seen, and cruised about all day, without the slightest trace of her. At night the Diamond bore up to Canso and landed the crew that had abandoned the schooner.

NEWS AROUND THE LAKES.

CHICAGO, ILL.

Special Correspondence to The Marine Record.

Palmer, Cook & Calbick chartered the steamer Onoko for barley to Buffalo at 1 cent.

J. G. Keith & Co. chartered the steamer Pentland for lumber, Ashland to Chicago at $2.37½.

Elphicke & Co. chartered the steamer Rhoda Emily for oats to Midland at 1¼ cents, the steamer J. J. Hill for corn to Kingston at 2½ cents.

The schooner Carrier, Capt. John Nelson, which arrived last Thursday with lumber from Frankfort, was stripped of her sails on the lumber market and went into winter quarters Monday.

Carr & Blair chartered the steamer John F. Eddy and consort Shaw for oats to Buffalo at 1 cent, steamer Progress for wheat to Buffalo al 1⅛ cents, schooner Oak Leaf for wheat to Milwaukee at ¾ of a cent free out.

Capt. John Prindiville chartered the steamer Norwalk, South Chicago to Duluth, for steel rails at 65 cents per ton free, the schooners Our Son and Genoa for lumber, Duluth to Chicago, at $2.25, the steamer Brittanic, for steel billets, South Chicago to Cleveland, at 55 cents per ton free.

W. G. Nourse, assignee of the estate of C. P. Willard & Co., sold the steam yacht Oneida to Capt. Eugene May, New Orleans, La., and she cleared Tuesday, Oct. 16, in charge of Capt. H. L. Lamphere and Engineer James Cahey. The Oneida is a very handsome well equipped and well built steam yacht and was built for exhibit at the World's Fair.

Charles Larsen, yacht builder, has hauled out E. P. Warner's sloop yacht Phantom at the foot of South Port Avenue and Lawrence street. She is to receive a new stem, new apron, new plank shear and rail amidships and necessary plank on her topsides, also part new deck and a new cabin, which will make her as good as new, she having received a new stern and a rebuild below the waterline last spring.

At Miller Bros.' shipyard the steamer Fred Mercur was in dock for recalking bottom, the Sunrise for stopping leak and a new rudder stock, the tug Alert for a new wheel, the steamers City of Duluth and City of Traverse for repairs, recalking and reironing, the tug Commodore, schooner Oak Leaf, schooner yacht Crusader and steamer O. E. Parker to have leaks stopped, the steamer M. C. Neff for repairs to rudder and shoe, the steamer J. C. Perrett for repairs to stern bearing.

Capts. D. Sullivan and J. C. Calbick held a survey on the schooner Sunrise in dry dock Saturday. She was leaking and had received damage to her rudder. She is also minus her mainsail, maintopsail, foresail, standing jib and jib topsail, her fore and main gaffs, are carried away and her main boom sprung. The Sunrise encountered a heavy gale at the Manitous on September 30th and remained there three days, when the steamer Fayette took her in tow for South Chicago where she was bound with salt from Bay City.

Exception is taken here to the statement made by the Buffalo special correspondent to the MARINE RECORD in your last issue, as to ship building and dry dock facilities at Chicago. Probably your correspondent is not aware that Miller Bros, have three dry docks, the largest of which is 310 feet on keel blocks and 14 feet over mitre sill, which is large enough to dock vessels considerably larger than the Neosho. Miller Bros. supply as good material and do as good work as any shipbuilders on the lakes, and probably have more vessels in their dry docks yearly than any other dry dock firm on the lakes.

Capt. M. Abrahamson, of the schooner Radical, showed good proof of his noble heartedness on his last trip. His schooner was bound from Chicago, light, for Manistique, and when off Fisherman's shoals, about 6 p. m., of September 27th, he saw a vessel on the shoal flying a signal of distress. As the sea was too rough to launch his yawl boat, he stood by the stranded vessel all night, and as soon as the sea ran down the next morning the Captain and his brother, A. Abrahamson, went in their yawl boat to the vessel which they found to be a scow loaded with bark and deserted by her crew, who had omitted to pull down their signal of distress before leaving her. Capt. Abrahamson found everything on board in good shape and left it as he found it. He expected to find some one on board, probably in trouble, and he says he will never pass by a signal of distress if it is possible for him to render assistance, notwithstanding the fact that he was misled and delayed unnecessarily in the present instance.

The schooner A. J. Mowry, which left here last Friday night for Sturgeon Bay for a load of Christmas trees, was towed into this port Sunday night by the tug Arthur Jones. She was leaking badly and had lost her foremast and bowsprit, foresail and headsails and gear in the heavy gale of Saturday when off Port Washington. Capt. Doyle makes the following report: "Shortly after we lost our spars a steamer came in sight and we hoisted a signal of distress, our colors at half mast. The steamer was certainly near enough to see us, but passed on without paying the slightest attention. Another steamer came along, nearer than the first, and that one also paid no attention to us. Others came close enough to see us, although farther away than the first two, and all without giving our signal the slightest heed. I would like to ask how in the name of humanity could the master of a big strong steamboat leave a vessel in distress in midlake without trying to render the boat or crew some assistance. At that time the sea was tremendous, and it was an even chance whether the Mowry would go down or stay afloat. I can only say of such men that they are cowards of the poorest type. Contrast this with the bravery of Capt. Hellesy, of the schooner Emeline, who proffered to stand by us, would have risked his own life in an effort to save ours. For him I can only speak in the highest terms of praise." The schooner Mowry is owned by Capts. M. Doyle and John Fahey, who have lost heavily by the disaster. The Mowry will go into winter quarters at once.

CLEVELAND, O.

Special Correspondence to The Marine Record.

Capt. Charles Beach, late of the steamer Pickands, is now with the Cleveland Towing Co., as night officer.

Capt. Dan McLeod, Manager of the Inland Lloyds, left here on Tuesday night for Chicago, and will return on Friday.

Work has not yet been started on the North Land, but orders to go ahead with her are expected in a few days.

The steamer Alcona was dry docked on Wednesday for repairs to the stern bearing. The schooner Alta to have a leak stopped.

The new steamer I. W. Nicholas, built for the Minch line by the Cleveland Ship Building Co., loaded 2,880 tons of flour this week at Duluth.

Mr. C. B. Calder, superintendent of the Detroit Dry Dock Engine Works, visited this port during the week, returning home Wednesday night.

Capt. James Davidson, of Bay City, spent a couple of days here this week. Capt. C. F. Palmer, the well-known vessel broker, also visited this port.

The large steel steamer just completed by the Globe Iron Works Co., has been chartered by the Northern Steamship Co. She will leave here on her maiden trip on Thursday.

Mr. T. W. Sheriff, of the Sheriff Manufacturing Co., Milwaukee, paid a business visit to Cleveland this week. Mr. Sheriff finds trade improving and he looks for a brisk winter's work at his Milwaukee plant.

Mr. F. P. Gordon, Assistant General Manager of the Northern Steamship Co., was in the city on Wednesday and inspected the new freight steamer at the yards of the Globe Iron Works Co. He left in the evening for Buffalo.

James McCarthy, a sailor on the steamer Alcona, lying at the Cleveland dry dock, fell from a gang plank to the bottom of the dock on Tuesday, and fractured his skull. He was taken to Lakeside Hospital. He is 33 years old and hails from Wilkesbarre, Pa.

Capt. F. D. Herriman, Manager of the Lake Department of the Bureau Veritas, gave evidence in the Swain case before Judge Ricks on Tuesday, and left for Puget Sound to survey and class the "whaleback" steamer Everett now building.

Director of Fire Service Hyman received a letter on Tuesday from Lieutenant Stephens, who superintended the construction of the hull of the new fire boat, John Farley, at Buffalo. He said that the hull was completed, and that, if the weather was favorable, the boat would start for Cleveland Tuesday night. She will be towed to this port for her machinery and fire equipment.

A damage suit against the underwriters who had risks on the steamer V. Swain last year, has been on trial here this week in the United States Court. Owners of the steamer claim the insurance, damage for the loss of business and damage to the steamer caused by her lying idle in the hot weather. Expert testimony was offered and a large number of witnesses were examined in the case.

Capt. Fred Boothman, a well known vessel master, died at his home on Scott street Sunday morning, after an illness of about three weeks of typhoid fever. Capt. Boothman took sick on his last trip down from Duluth, but thought by remaining ashore a few days he would be well enough to take charge of his boat when she came around again. He went to bed the day his boat left here and died the day she returned. Capt. Boothman sailed the steamer Alcona for the past three seasons, and was well liked by all who knew him. He leaves a wife and four children.

The Merida is the last victim of the obstructions in the "Soo" River. While bound down from Ashland to Chicago, she picked up a boulder or other obstruction at the spot known as the "black hole." The Merida is one of the largest and fastest boats on the lakes and in freight steamers no one has any business with her except the new steel steamer Harvey H. Brown. As Mark Twain says, "if she only had a little more sheer and a bigger wheel" it is probable that the North West and some of the other flyers would have to take her smoke.

The C. & B. Line steamer State of New York, has gone into winter quarters this week. The Ohio will keep the route open until snow flies.

BUFFALO, N. Y.

Special Correspondence to The Marine Record.

Maj. Ruffner, Corps of Engineers U. S. Army, United States Engineer at this port, opened the sealed proposals this week for furnishing a plant and excavating for the deepening of the channel of Niagara River between Port Day and Tonawanda. Hingston & Woods were the lowest bidders. They agreed to do the work, furnishing a tug, for about $80 a day. Carkin, Stickney & Cram, of Saginaw, Mich., were the only other bidders. Their bid amounted to about $130 a day. The appropriation for this work is $30,000, and the contractors will begin work as early as possible.

Coal shipments last week aggregated 69,660 tons. This is a slight increase over the average of late, but it is not a promise of large shipments in future.

The propeller Pabst in coming down the creek from the Blackwell Canal on Tuesday, ran into the propeller Pawnee, which lay at the Lackawanna chutes, doing quite a little damage. The tug Maytham, at the time, was coming in with the schooner Harvey Bissell, and was not able to fetch up till she fouled the Pabst, which was lying almost broadside across the creek. Neither tug nor schooner was damaged.

DETROIT, MICH.

Special Correspondence to The Marine Record.

The schooner Charles Foster was given a new gaff this week at the yards of the Detroit Dry Dock Co.

Another large boulder was taken out of the channel at Amherstburg, on Saturday, by the Canadian dredge at work there.

H. M. Loud & Sons, of Au Sable, Mich., are building a new tug at their yards. She is to be used for their own towing work.

Langell & Sons, of St. Clair, Mich., are building a small ferry boat for local owners.

The steamer S. J. Macy was at Oades' ship yard this week for some new work and repairs.

Thos. Thurston has just eompleted the building of a steam yacht for Capt. McAlpin. She is to be launched on Saturday.

The steamer S. J. Macy and schooner Daniel G. Fort were chartered here this week for wheat to Buffalo.

Major M. B. Adams, corps of engineers U. S. Army, is at the "Soo" inspecting the preliminary work on the Hay Lake channel system of lighting.

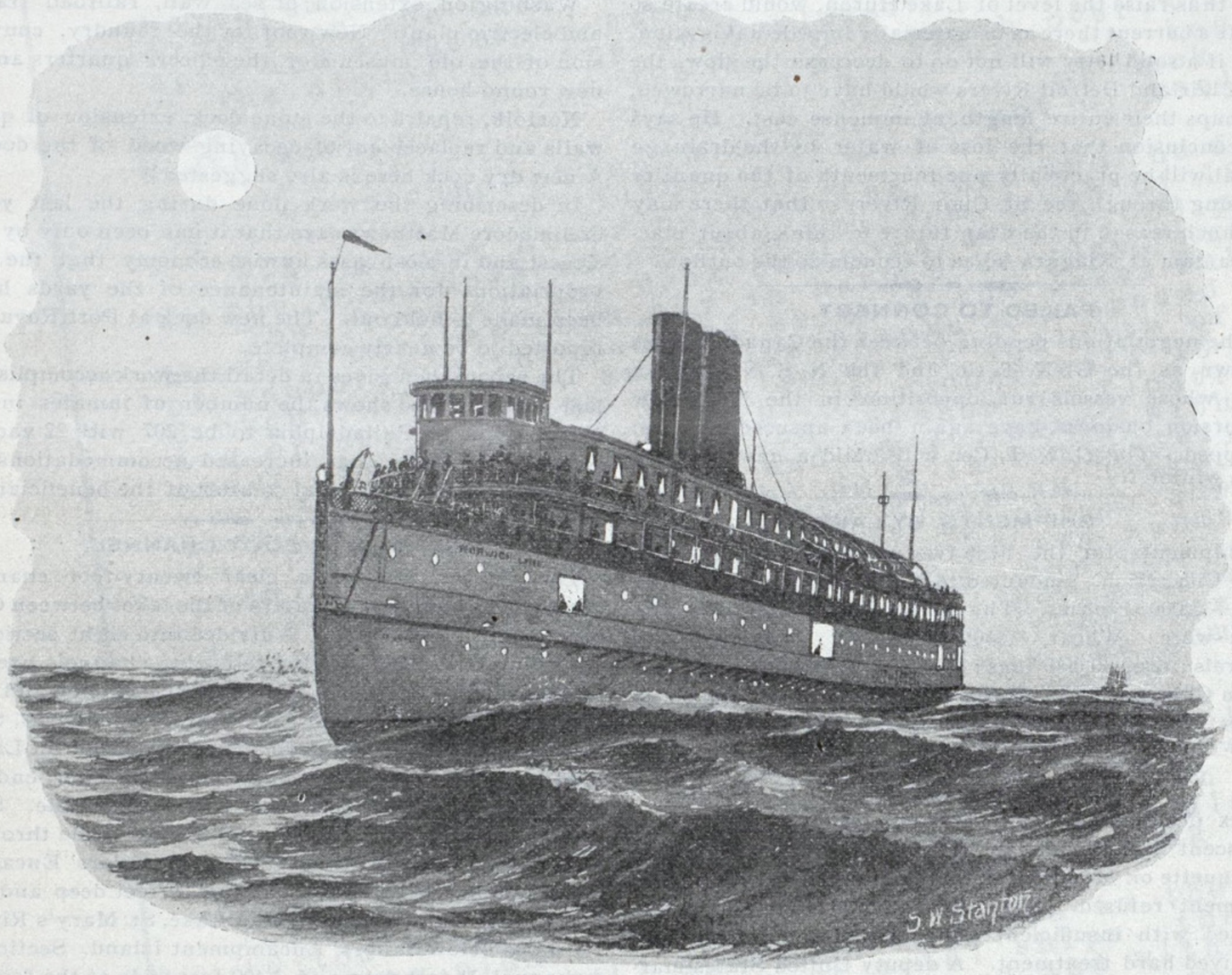
The schooner N. C. West, Alpena to Toledo with lumber, and the Harold, consort of the P. J. Ralph, collided in the St. Clair canal, on Sunday, damaging the former vessel so that temporary repairs were found necessary before she could proceed to her destination.

A LONG ISLAND SOUND STEAMER.

(ILLUSTRATED)

Through the courtesy of *Seaboard*, New York, we are enabled to present to our readers a view of a new steel twin screw passenger boat, just placed on the Long Island Sound route. The "Lowell" was built by tne Bath Iron Works, Bath, Me. Her general dimensions are 336 feet in length, 49½ feet molded beam and 66 feet over guards, with a registered tonnage of 2,975 tons. Her engines consist of two independent sets of vertical inverted direct acting triple expansions with cylinders 26, 40 and 64 inches by 36 inch stroke, total I. H. P. 4,600. The six boilers are of the Scotch type, 12 feet 10 inches by 13 feet 6 inches in diameter. The Lowell was designed by A. Cary Smith and the machinery by Mr. Charles E. Hyde, designing and constructive engineer of the Bath Iron Works, who, it is said, enjoys the distinction of having built the first triple expansion engine in the United States. The success of the City of Lowell in speed and high class of construction is a triumph for her builders and with the manganese bronze propeller wheels 11 feet in diameter and 16 feet 8 inches pitch, her speed is placed at an easy 23 miles an hour.

Some of the more notable firms furnishing the equipment of this floating palace are the General Electric Co., Schenectady, N. Y., dynamos and search light; Williamson Bros., Philadelphia, steam steerer; Henry W. Miller & Sons, Philadelphia, patent asbestos felt, covering boilers and steam pipes; Randolph & Clowes, Waterbury, Conn., copper pipe; Page Bros., Boston, electrical fixtures and superintendence of electric lighting; the Star Brass Manufacturing Co., Boston, Mass., steam guages, revolution counters, clocks, etc. Quite a long list of other special manufactures entered into the equipment of the vessel, but the foregoing are among the best known and prominent firms in their several manufacturing specialties.



"CITY OF LOWELL," NORWICH LINE.

AIDS TO NAVIGATION.

The light-house board is now engaged in preparing its annual report for submission to Congress.

Concerning the work authorized to be done at Michigan ports, the report will show that the work of lighting the Hay Lake Channel has progressed satisfactorily, and that the lights provided for, at a cost of $43,500, will be in place by the time navigation opens next spring.

Negotiations for the purchase of a site for a light-house and fog signal at Big Bay Point are in progress, but it is not expected that the buildings will be completed for a year or more. Twenty-five thousaud dollars was appropriated for this purpose.

A similar appropriation was made for a light and fog signal at Forty Mile Point. The necessary steps have been taken to secure the site, but the title to the same has not yet been submitted to the attorney-general.

The work of moving beacons at Grassy Island Range is about complete.

Five thousand five hundred dollars was made available for establishing a steam fog signal near Pere Marquette light station. Materials have been purchased and the signal will be ready for use with the opening of navigation.

Not much has yet been accomplished towards establishing the Round Island light and fog signal, title to necessary land not having been secured.

The Seul Choix light and fog signal are well under way, and both will be completed by the opening of navigation in 1895. The board has not yet fully decided what new work for the lakes shall be recommended.

VIBRATION IN STEAMERS.

Herr Otto Schlick, in a paper submitted to the international engineering congress at Chicago, tabulates the forces causing vibration as follows:

1. The thrust of the propeller or screw in driving the vessel forward.
2. The twisting couple exerted by the engines.
3. The twisting couple exerted by the screw.
4. The centrifugal force of the rotating masses, if the center of gravity is not in line with the axis of revolution.
5. The inertia of the reciprocating parts, especially the piston rod, connecting rod, etc. This latter being the important factor.

As a means of accurately determining the vibration existing in any vessel, Schlick uses an apparatus devised by himself. He advises the simultaneous use of several of these in different parts of the vessel, and claims that an analysis of the diagrams so taken will give a very clear idea of the complete vibratory phenomena as they occur in the ship.

The prevention of vibration has been a serious stumbling block in attaining high speed, and up to within a short time there has seemed almost no chance of it ever being solved. Recently things have taken a turn and it now seems as though the problem is in a fair way to be settled. In torpedo boats this vibration has given most trouble, and it is largely due to the efforts of builders of this type of vessel that the causes or laws governing the vibratory motion has been developed.

Yarrow's latest production, the Hornet, one of thirty-six torpedo boats of the first class now under construction for the English navy, has been tried, and developed very satisfactory results.

The most noticeable features of her trial were, first, that a boat only 180 feet long should attain a speed of nearly 30 knots, or 34 land miles, for a short spurt, and maintain for three hours a mean speed of 27.313 knots. Secondly, that this speed was not attended by the usual vibration that has shown itself in these vessels whenever great power has been placed in a light hull. The Hornet is a vessel of only 220 tons displacement developing 4,300 maximum horse power, or nearly 20 horse power per ton of total weight of boat, with engines and boiler complete. A few years ago it is doubtful if the power could have been got into the boat at all. Even then the excessive vibration would have racked the hull to pieces. Until quite recently it has been a common thing for torpedo boats to be hauled out and re-riveted on account of the shaking up they received while on trial. It is a fact that in England officers of these boats have lost the filling from their teeth through jarring. The Cushing, our only actual torpedo boat in service so far, has shown another evil due to vibration. Several officers have complained of the effect on their nervous systems of the constant jarring, and one or two of her crew were made actually sick by the same cause. Thus when we see that the English built torpedo boat Hornet showed no vibration whatever, it may be conceived that a great advance has been made in doing away with vibration.

PRAISE FOR THE LIFE-SAVERS.

Capt. Jex, of the schooner Wesley, gives credit to the life-saving crew that took him off his vessel, and has published the following card under date of October 12:

"I wish to give my sincere thanks to the captain and crew of the Point Aux Barques life saving station, as these brave men deserve great credit for coming out ten miles in a heavy sea and rescuing the crew of seven persons who were on the schooner John Wesley, which was waterlogged and on her beam ends.

"I also extend my sincere thanks to Capt. Jamieson and Mr. F. White and others of the crew of the steamer George H. Dyer, who did all in their power to render us comfortable in our distressed condition while on board of that craft. The steamer towed the lifeboat as near Port Hope as she could, where we were all landed safely."

NOTES.

CRAWLEY & JOHNSTON, Cincinnati, have just closed a contract to equip the new steamer Imperial, now building at Howard's shipyard, for the Red River line, of New Orleans, with a "Cincinnati" steam steering gear.

THE British Admiralty are formulating a plan to man certain subsidized merchant steamers with the officers and men of the Royal Naval Reserve. This would place on these vessels thoroughly disciplined crews, ready to assist in naval warfare at once, if necessary. The project includes twenty vessels, such as the Majestic, Etruria and Umbria.

BARRATRY, heretofore punishable with death, is no longer a capital crime, President Cleveland having signed a bill changing the penalty to imprisonment for a term of years, at the discretion of the court. The change has been made in the interest of the marine underwriter who avoids the payment of insurance if barratry is proven. This has heretofore been found impracticable on account of the death penalty.

M. FLAMMARION, the distinguished French astronomer, expresses the opinion that Mars is much further in advance in astral life than we are. It is older, smaller and therefore more easily cooled and while more distant from the sun and possessing a more severe climate than the earth, there is no reason why human life should not exist under much similar conditions prevailing here. He is not willing to go so far as the lawyer-astronomer of Denver, who declares that he knows that no man on Mars is less than seven feet tall or lives less than 100 years, but he believes the chances are in favor of the planet being inhabited.

CAPT. JOHN STRECKFUS, owner, master and manager of the steamer Verne Swain, which runs in the Acme Packet Co. between Lyons, Fulton, Clinton, Rock Island and Davenport, on the upper Mississippi River, writes to the American Ship Windlass Co., of Providence, R. I., as follows in regard to a small steam capstan which this company lately furnished for his steamer: "Enclosed please find draft in payment of the capstan purchased of you and in regard to same would say that we remit for the capstan cheerfully, as same proves to our entire satisfaction. It is the same old story wherever the Providence capstans are concerned. The small steam capstans made by this company are peculiarly adapted for light steamers on shallow streams.

NOTICE TO MARINERS.

UNITED STATES OF AMERICA—NORTHERN LAKES AND RIVERS—MICHIGAN.

PILOT ISLAND RANGE LIGHTS.—Notice is hereby given that on or about October 15, 1894, two fixed red lens-lantern lights will be established at Pilot Island, south side of Mud Lake, St. Mary's River, to mark a range line intersecting with the Winter Point Range line at Mud Lake Turning Buoy (first class can, black and white perpendicular stripes) and guiding between the buoy and a point about ⅝ mile to the southward and westward of Encampment Crib Light.

NOTE—Keeping the rear light open a little to the westward of the front light will carry in the best water, on a course about S. by W. ¼ W.

The front light will be shown at a height of 26 feet above the mean level of the lake from a white post on the center of Pilot Island.

The rear light will be shown at a height of 42 feet above the mean level of the lake from a white triangular pyramidal skeleton iron tower on a cluster of piles about 1,500 feet S. by W. ⅜ W. in rear of the front light. The upper part of the tower is covered with a day mark of white horizontal slats.

Bearings are true.

By order of the Light-House Board,

JAMES A. GREER,
Rear-Admiral U. S. Navy, Chairman.

Office of the Light-House Board, Washington, D. C., Oct. 11, 1894.

SAULT STE. MARIE WHARF LIGHT.—A light to indicate the location of the government wharf at Sault Ste. Marie, on the Canadian side of the River St. Mary, between Lakes Huron and Superior, was put in position on the 10th August last. The light is a fixed red light, shown from a square tubular lantern hoisted on a pole. It is elevated 14 feet above the level of the river, and should be visible two miles from all points of approach. The mast stands on the wharf 25 feet from its S. E. corner.

LIGHT ON RICHARDS LANDING WHARF.—An arrangement has been made by the government of Canada with Messrs. Smith & Co., owners of the wharf at Richards Landing, in St. Joseph Channel, District of Algoma, Ontario, by which they will maintain, for the purposes of navigation, a light upon the wharf. This light was put in operation on the 4th September. The light is a fixed white light, shown from a seventh order dioptric lens lantern, hoisted on a wooden frame work placed at the outer end of the wharf. It is elevated 21 feet above the level of the water and should be visible nine miles from all points of approach. The frame work on which the lantern is hoisted has a shed or small cabin at its base. This structure is about fifteen feet high and is painted white.

WM. SMITH,
Deputy Minister of Marine and Fisheries.

Department of Marine and Fisheries, Ottawa, 1st October, 1894.

CHICAGO DRAINAGE CANAL.

An interesting paper on the "General Hydraulic Features of the Drainage Channel" was read last week at Chicago before the Western Society of Engineers, by Mr. T. T. Johnson. The paper dealt with the levels of Lakes Michigan and Superior and the effects of the new waterway upon them and upon the Desplaines, Illinois and Mississippi Rivers.

Mr. Johnson estimated that the drainage channel with its capacity of 10,000 cubic feet per second would lower Lake Michigan 4 or 5 inches. Yet the level of the lower lakes, he thought, could, if necessary, be regulated. Lake Superior, the great natural reservoir, is 20 feet above Lake Michigan and its outlet is a rocky ledge.

The Chicago River, Mr. Johnson said, could not supply the channel with the full amount of water necessary and the problem of the city would be to increase the supply. He discussed several plans but thought the Calument River would have to be utilized for the purpose.

The plans of the Desplaines River diversion were explained, as providing for the spill of all the flood waters of that stream on the other side of the divide. This flood water would not raise the Illinois River more than a foot and a half to every 10,000 cubic feet of storm water, not sufficient to do any damage. The effect of the channel would be to raise the water in the Mississippi one foot. He said, with less than the expense of building the Hennepin Canal, the Illinois River below Utica could be given a depth of fourteen feet, and the largest boats could reach Hennepin, by way of the Illinois River, in less time from Rock Island than by going through the Hennepin locks.

In discussing the Mississippi as related to the channel, Mr. Johnson estimated, with the reservoirs the government is building at the head of the river, and with a full supply of water in the channel, the river at St. Louis could be increased six feet at periods of low water.

Gordon H. Nott, an engineering expert of Chicago, says that the canal will carry off not less than 600,000 cubic feet per minute, south to the Illinois River and thence to the Mississippi. This amount of water will decrease by about 7 per cent. the flow of water now flowing out of Lakes Huron and Michigan through the St. Clair River. He believes that the level of the water in the St. Clair and Detroit Rivers and Lake St. Clair will be lowered 15 or 16 inches and Lake Erie a little more. He says, with a good show of reason, that the proposed narrowing of the outlet of Lake Huron by the construction of solid jetties to impede the flow of water, and thus raise the level of Lake Huron, would create so swift a current there as to materially impede navigation, and if a solid jetty will not do to decrease the flow, the St. Clair and Detroit Rivers would have to be narrowed, perhaps their entire length, at immense cost. He says in conclusion that the loss of water by the drainage canal will be practically one-fourteenth of the quantity passing through the St. Clair River, so that there may be much reason in the near future to think about placing a dam at Niagara so as to economize the outflow.

FAILED TO CONNECT.

The negotiations pending between the Canadian lines known as the G. N. T. Co. and the N. S. Navigation Co., whose vessels run opposition in the Mackinaw excursion business, have again been unsuccessful and dropped. The G. N. T. Co. will build a new steamer this winter.

SHIPMENTS BY LAKE.

Shipments for the first two weeks in October from Bay City, Mich., amounted to 10,766,000 feet of lumber and 735,000 shingles. The week's shipments from Duluth were: Wheat, 1,500,000 bushels; flour, 2,500,000 barrels; ore, 40,000 tons; lumber, 12,000,000 feet, and from Chicago 58,931 barrels of flour, 365,890 bushels of wheat, 287,946 bushels of corn, and 566,000 bushels of oats.

A TRIVIAL LIBEL.

Six deckhands on the steamer James Fisk, of the Crescent Line, made an attempt to libel the boat at Marquette on Monday for wages claimed to be due and payment refused. They also alleged that they were served with insufficient and unwholesome food, and received hard treatment. A deputy United States marshal went to the steamer with the attachment papers, when he found that the charges were untrue. The captain offered to pay off all who wanted to quit except two men who had signed a contract. These he insisted should be held to its terms. One of them returned to work, but the other refused, when he was promptly put in jail.

THE NEOSHO AT MILWAUKEE.

The wrecker Favorite arrived at Milwaukee Saturday night with the steamer Neosho. While crossing to the west shore from the Straits heavy weather was encountered, which caused the steamer to strain and leak badly, making it necessary to work the steam pumps. Shelter was found behind Summer Island, where ten hours were spent. The port side of the Neosho amidships is broken down a distance of eight feet from the rail, steel chord and all. On the starboard side some planks are broken, but the steel chord remains intact. Her bottom amidships is badly damaged, but no injury has been done to her engine, boilers or steering apparatus. Capt. Davis, wrecking master for David Vance & Co., states that in the gale of a fortnight ago, the Neosho pounded so hard that the boulders on which she rested, some of them two feet in diameter, were literally ground into pummice. While the damage sustained by the steamer is severe, Capt. Davis thinks the wrecking and repair bills will fall far below the amount necessary for abandonment to the underwriters.

NAVAL EXPENDITURES.

The annual report of Commodore E. O. Matthews, to the secretary of the navy upon the naval yards and docks estimates the expenditures for the next fiscal year at $1,861,295, which is a reduction of the estimates submitted by the commandants of the yards of $5,646,820. The heaviest cut in these estimates is in the item of improvements, which is reduced from $6,221,712 to $1,044,803. The item for general maintenance is cut $157,000 and that for repairs $300,000.

The leading feature of the report is the suggestion by the chief of the urgent need for at least four new drydocks to be located at League Island, Pa., Boston, Norfolk and Mare Island, Cal. The principal improvements recommended at the different yards are as follows:

At Boston, rebuilding wharf No. 4, a modern dry dock there is suggested, but no estimate is given.

New York, new pumping plant for the granite dock. A new workshop for construction and repair. An iron shipwright shed. Dredging wall about channel and quay walls for Whitney basin and the Cobb dock.

League Island Home, dredging; extension of the quay walls and an artesian well; a new dry dock here is also suggested, but not estimated for.

Washington, extension of sea wall, railroad tracks and electric plant. New roof for the foundry, conversion of the old museum of the officers' quarters and a new round-house.

Norfolk, repairs to the stone dock, extension of quay walls and replacement of decaying wood of the docks. A new dry dock here is also suggested.

In describing the work done during the last year, Commodore Matthews says that it has been only by the closest and in most cases unwise economy that the appropriations for the maintenance of the yards have been made to hold out. The new dock at Port Royal is reported to be nearly complete.

The report then gives in detail the work accomplished last year and also shows the number of inmates in the Naval Home at Philadelphia to be 207 with 22 vacant rooms, and urges that increased accommodations be provided for the additional comfort of the beneficiaries.

THE TWENTY-FOOT CHANNEL.

The project to give a clear twenty-foot channel through the connecting waters of the lakes between Chicago, Duluth and Buffalo, is divided into eight sections, according to locality and the following channels are to be excavated: Section 1, a channel 21 feet deep and 300 feet wide at Round Island Shoals, St. Mary's River. Section 2, a channel 21 feet deep and 300 feet wide in Little Mud Lake, St. Mary's River, between the lower end of Sugar Island and the lower end of the Dark Hole. Section 3, a channel 21 feet deep and 300 feet wide through a reef in St. Mary's River abreast of Sailors' Encampment Island. Section 4, a channel 21 feet deep and 300 feet wide through a shoal in Mud Lake, St. Mary's River, 1½ miles below Sailors' Encampment Island. Section 5, a channel 21 feet deep and 2,400 feet wide at the foot of Lake Huron. Section 6, a channel 20 feet deep from deep water in St. Clair River through St. Clair Flats Canal to deep water in Lake St. Clair, with a width above St. Clair Flats Canal not greater than 650 feet, thence gradually narrowing to the canal, thence for the full width of the canal for its entire length, thence gradually widening to a width of 800 feet at deep water in Lake St. Clair. Section 7, a channel 20 feet deep and 800 feet wide through Grosse Point Flats, Lake St. Clair, Michigan. Section 8, a channel 21 feet deep and 800 feet wide through the bar at the mouth of Detroit River.

LIQUID FUEL.

The Chicago City Engineer has been furnished with an official report of the test recently made with liquid fuel on the tug Blackball and it is now understood that the municipality will enforce the use of the oil instead of soft coal on all tugs so as to conform with the smoke ordinance.

The test of using oil for fuel in tugs was successful in every particular and the report enters into all the circumstances attending the trial.

AN ELECTRIC HOISTING WINCH.

The American Ship Windlass Co., of Providence, R. I., has obtained a patent on a winch operated by an electric motor on its bedplate, and having an improved stop mechanism by which the winch and the motor may be stopped at given points when hoisting or lowering.

WILLIAM L. BROWN, PRESIDENT.
WALTER F. COBB, VICE PRESIDENT AND TREASURER.

W. I. BABCOCK, MANAGER.
O. R. SINCLAIR, SEC'Y AND ASS'T TREAS.

LONG DISTANCE TELEPHONES:
SHIP YARD OFFICE,
"SOUTH CHICAGO 40."
CHICAGO OFFICE,
1013 ROOKERY,
"MAIN 3447."

FORM 1.

CHICAGO SHIP BUILDING COMPANY,

STEEL STEAM-SHIP BUILDERS,

101ST STREET AND CALUMET RIVER.

CHICAGO ILL., STA. S. October 15th, 1894.

Special Notice.

We take pleasure in announcing the completion, at our yard on the Calumet River in South Chicago, of a DRY DOCK which is the largest on the lakes and fitted with all modern appliances for the rapid and economical execution of repairs to all classes of vessels.

The dimensions are as follows:

Length	425 ft.	Depth over sill,	17 ft 0 in.
Width at top,	100 " 0 in.	" " keel blocks	17 " 0 "
" on floor	80 " 0 "	Height of dock total,	23 " 6 "
" of entrance on top	70 " 0 "	" " keel blocks,	5 " 0 "
" " " sill	50 " 0 "		

The Calumet River between the lake and the dock has been dredged by the U. S. Government to a uniform depth of 18 ft.- 0 in. The floor of the dock contains over 2,000 piles, driven 5 ft. between centres each way in hard blue clay, and is amply capable of supporting the largest ship of the lakes fully loaded to 20 ft. draught. The keel and bilge blocks are spaced every 5 feet, and are of ample height to allow every facility of movement to workmen under the bottom of a ship. A rudder well 10 ft. deep is situated near the dock entrance. The caisson or floating gate is built of steel and is 72 ft. long and 15 ft. beam, with nine 30 in. valves for flooding the dock. The dock is completely surrounded by a puddled wall of blue clay for stopping leaks.

The pumping machinery, built by the Southwark Foundry & Machine Co., of Philadelphia, consisting of two submerged 30 in. centrifugal pumps, driven by 18in.x 18in. vertical engines, and, with a combined capacity of 50,000 gallons per minute, will empty the clear dock in two hours. A battery of four 60 in. x 16 ft. horizontal boilers, burning oil for fuel, drives the pumping engines and also furnishes power for the saw and jig mills.

Four steam capstans, one at each corner of the dock, afford every facility for handling and placing the largest ship. The dock is lighted by two arc lights at the entrance and 50 incandescent lamps spaced around the sides. Three steam derricks are supplied for hoisting and one side of the dock is also commanded by the 10-ton Brown travelling cantilever derrick belonging to the ship building plant.

We beg to call special attention to the unequalled facilities afforded for the repair of metal ships, the dock being situated entirely within our building yard and within 50 ft. of our shops. A large stock of plates and shapes for repair work is kept on hand at all times. For the repair of wooden vessels our facilities are equally complete, a jig mill and saw mill of large size, driven by an independent engine, having been added and placed immediately adjacent to the dock, and a sufficient quantity of oak and pine plank and timber will be always in stock. We have also remodelled entirely our machine shop, increased it largely in size and added heavy tools of all kinds of machinery in size and added economy and despatch. A set of three-legged steel repairs with operated by steam, 110 ft, high and 100 tons capacity, are located on our river front close to the dock.

The dock has been built from the designs and under the supervision of Mr. A. V. Powell, C. E. of Chicago, and will be opened for service on November 1st, 1894. We have associated with us Mr. James Mowatt, for many years manager of the now abandoned South Side Dry Docks of Chicago.

Soliciting the patronage of the marine interests of the great lakes, which will have our best attention and despatch, we shall make every effort, by fair dealing and strict attention to business to secure its continuance.

CHICAGO SHIP BUILDING CO.

By W. I. Babcock. MANAGER.

THE MARINE RECORD

ESTABLISHED 1878.

PUBLISHED EVERY THURSDAY, AT 144 SUPERIOR ST., (LEADER BUILDING), CLEVELAND, O.

IRVING B. SMITH, CAPT. JOHN SWAINSON, } . . . PROPRIETORS

BRANCH OFFICE:

CHICAGO, ILL., ... 179 LaSalle Ave.

THOMAS WILLIAMS, Associate Editor.

SUBSCRIPTION.

One copy, one year, postage paid, . . . $2 00
One copy, one year, to foreign countries, . . $3 00
Invariably in advance.

ADVERTISING.

Rates given on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

CLEVELAND, O., OCTOBER 18, 1894.

COMPASSES.

Every vessel master should know how to adjust his own compasses, but for one reason and another very few do, generally because they look upon compass adjusting as a mysterious art, only to be approached by trained men and experts; whereas a working knowledge of the subject is not at all difficult of attainment. In order to elucidate the matter it is necessary to go back briefly to first principles. The earth is a huge magnet, the one half of which, north of the magnetic equator, filled with blue magnetism—so termed for the sake of distinction, although of course there is no color about it—and the other, or southern half, with red magnetism. The poles of the earth's magnetism, to which the end of compass needles point when undeflected by local attraction, are situated near the true poles, but are not actually coincident with them; the angle at any place between the true and magnetic poles being the "variation" for that place. All fixed magnets, or pieces of iron or steel in which magnetism has been induced by other magnets, have their two poles also, north and south, or blue and red, the red pole of one magnet attracting the blue pole of another, and *vice versa*, and the red pole of one magnet repelling the red pole of another. All magnets have one very peculiar property, that is, the power of "inducing" or "causing to appear" magnetism in other bodies near them, and subject to their influence. For instance, if a common bar magnet, such as is nailed on deck for adjusting, be laid near and parallel to a piece of soft iron of the same dimensions, the red or south pole of the magnet will at once "induce" a blue or north pole in that end of the iron which is next to it, and the blue pole of the magnet cause a red pole to appear in the other end of the iron. Thus the piece of soft iron has become an induced magnet, and remains so until removed from the influence of its parent magnet. Should the soft iron be placed with one end against the center of the magnet, and at right angles to it, no effect will be produced, as in inducing the iron, one pole of the magnet neutralizes the work done by the other; the degree of induction therefore depending on the angle the soft iron makes with the magnet. In like manner the great primary magnet, the earth, induces magnetism in every particle of iron on its surface in proportion to the degree of angle the iron may make with the "line of force," which is the term used for a line drawn from the observer, slanting through the earth to the magnetic pole, and along which line its force is exercised. It is made clearer to the mind by imagining the nearest pole to do all the work, then the ends of all iron nearest to the north or blue pole will contain red magnetism and the further ends blue. The most concise way of remembering this is by saying, "nearest ends have opposite names, and further ends the same."

Thus it will be seen that the upper ends of all vertical iron, such as smokestacks, ventilators, davits, etc., being further from the pole, are in north latitudes filled with blue magnetism, and attract the south or red end of the compass needle, which it must be borne in mind is at the north point of the card. When this vertical iron is carried to the magnetic equator, both ends are equally distant from the poles, and the effect is *nil*, vertical iron having now no effect on the compass, and when in southern latitudes the upper ends are filled with red magnetism—being further away from the red or south pole—which repels the north point of the card. The whole thing may be summed up by saying that in northern latitudes all upper ends of vertical iron attract the north point, while in southern they repel it, and when on the magnetic equator, and in a transition stage, vertical iron has no effect on a compass.

WESTERN DEVELOPMENT.

The Asiatic trade of this country ought to be controlled by our Pacific coast ports, but if some very radical means are not used for overcoming the competition of the Dominion of Canada, there will be very little Asiatic trade for those ports to manage. This competition is of the most aggressive kind, and our laws seem to help foreigners in this respect rather than American enterprises. There is no reason why the Asiatic trade should not be handled on United States soil, and deposited at the head of Lake Superior for transportation again by water to eastern points. Puget Sound offers every possible advantage for heavy draft vessels, and our own transcontinental lines of railroads are well able to handle the commerce now allowed to drift out of its natural channels or to be subverted through the commercial acumen of the Canadians, ably assisted by the mother country. The longer the Pacific ports are left undeveloped, the more difficult it will be to engage successfully in the freight and passenger business between the Asatic ports and our western borders. Should this trade be wisely developed, we feel certain that the chain of lakes would reap a corresponding benefit, as transportation by water over the area of the lakes could be carried on at a rate which would repay for the handling and trans-shipment of east bound merchandise. The Dominion government are certainly alive to the advantages gained by their subsidizing the large lines now trading between their western borders and Asia, and a lucrative trade has been found for some of their surplus tonnage, which was becoming a little too slow for the demands in their Atlantic service. With the commercial hold already secured by our neighbors, and the subsidizing of a fast Atlantic service, which they are in hopes of accomplishing at an early date, the opportunity for developing our Asiatic trade via. the Pacific coast and thence across the continent is lessening each year.

AIDS TO NAVIGATION.

It would be well for our sailing community and vessel interests generally to clearly understand that a staff of skilled United States officials are ever ready to receive correspondence regarding the displacement of buoys, reports concerning improvements in marking or lighting channels and fairways, determining the location of reefs and shoals, and all other authentic information appertaining to the facilities of commerce on the Great Lakes. A uniform courtesy, with an earnest desire to work in accord with the interests over which they severally preside, are the characteristics of the past and present officials, and the day is near at hand when every buoy, or stake over the area of the chain of lakes coming under the jurisdiction of the United States government will be directly under the control of these important district officials. Already vast strides have been made in this direction through the skilful and judicious annual reports forwarded on to Washington from the several district officers, and in all cases the technical intelligence conveyed in these annual reports receive the hearty support of those members who are engaged in the vast commercial interests now being centered in the safe navigation of these inland seas, knowing, as they should do, that the most technical skill that can be produced is added to a prudent consideration of even the most minute change or improvement in the aids to navigation. Within the course of a few days a committee from the Lake Carriers' Association will meet with the officers of the Light-House Board at Washington to confer upon the advisability of establishing several more important aids to navigation.

SALVAGE SERVICES.

Salvage services are no longer valued at the enormous figures which formerly obtained when valuable property was assisted, and perhaps there is no branch of the maritime affairs which has undergone so general a modification as the laws relating to salvage. In former days the salvor held almost absolute control of the property salved, and his claim was considered paramount in priority of claims and amount, even though the risks taken by the salvor were comparatively very insignificant. The above view of the salvage question no longer obtains, nor are excessive amounts claimed or awarded for services involving slight risk to life and property. Detention and labor are, of course, considered legitimate claims and are now invariably allowed by the admiralty courts of all nations. Yet, a fair recompense is considered amply sufficient to meet the claims of the salvor, as opposed to the excessive charges of but a few years past. Large risks, considerable techical skill, detention during the prosecution of a voyage and actual losses sustained form the chief factors in determining the amount of the awards granted for salvage services in these days, and unless either or all of the above features enter into the services rendered, the amount of salvage, even if the property saved is of high value, is cut down to a claim commensurate with the value of ordinary achievements in the general course of business.

NAVAL RESERVE FORCES.

The State of Michigan is liable to show Ohio the way to muster a naval reserve auxiliary. Ohio has never touched upon this most important adjunct to the federal service, and while the volunteer force ashore is all that it ought to be, the wide expanse of territory covered by the Ohio shores on Lake Erie has been left untouched. We now learn that a movement has been started to organize a naval volunteer corps in cities bordering on rivers and that the government will be asked to furnish uniforms and arms for the recruits. The citizens of Ohio should take the matter of organizing a state naval reserve force in hand and show our New York and Michigan neighbors that "a Perry" may possibly exist. The first step in this direction is to establish a drill ship under the auspices of the federal government so that the rising generation may be permitted to acquire the skill necessary to be displayed should occasion demand it. The corps organized in Detroit is now on board the U. S. S. Michigan and going through their daily drill like old tars.

IT is becoming quite frequent, and perhaps more marked this season than ever before, for damage claims to be made on vessels consigned to Tonawanda, N. Y., with lumber. Irregardless of the quality of the lumber, which, of course, is all merchantable stuff, claims have been lodged against vessels for delivering stained boards, and it is even stated that a discoloration caused by water has been sufficient excuse to hold back a portion of the freight so as to indemnify the consignee. Of course, we can't credit the latter statement, but it is certain that deductions from the freight money have been made for a trivial discoloration due to an unclean swept hold, signs of fueling over a portion of the deck load, etc. Masters of vessels chartered for Tonawanda would do well to take every precaution in loading, carrying and handling a lumber cargo consigned to that port, so that neither the ship or underwriters need be mulcted in damages. In so far as the vessel is concerned, where heavy weather has been met with, and through a wash of water at the bilges or from any other cause it is thought that some portion of the lumber may turn out discolored, it would be advisable to note a protest and extend it when the damage is ascertained, so as to clear the vessel. But even after this has been done underwriters will not care to meet paltry claims on a vessel too often.

LIGHT-KEEPERS APPOINTED.

The secretary of the treasury has appointed Thomas L. Kean master of light vessel 63, at Ballard Reef, Detroit, vice Christopher Crisp, resigned; George R. Holden, assistant signal station keeper at Detour, vice David Pugh, removed, and Bartholomew Whelan, assistant keeper of the fog signal station at Fourteen Mile Point.

STAGE OF WATER AT ST. MARY'S FALLS CANAL.

DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

Depth of water at the St. Mary's Falls Canal for the week ending Oct. 18, 1894:

Oct.	11	8	a.	m.,	14	feet	9	inches.	8	p.	m.,	14 feet 8 inches.
"	12	"			14	"	9	"	"			14 " 10 "
"	13	"			14	"	10	"	"			14 " 8 "
"	14	"			14	"	6	"	"			14 " 7 "
"	15	"			14	"	7	"	"			15 " 8 "
"	16	"			14	"	8	"	"			14 " 10 "
"	17	"			14	"	10	"	"			14 " 7 "
"	18	"			14	"	8	"	"			

THE WEATHER BUREAU WORK.

The work of the U. S. Weather Bureau in reporting the rise and progress of the hurricane that swept up the Atlantic coast a short time ago, and the consequent saving of hundreds of thousands of dollars of shipping and untold lives, and the inability of the bureau to give notice to the gulf states of the approach of the hurricane, has drawn attention to the need of an extension of signal service system down the gulf coast to Yucatan. The weather bureau officials say that every year one or more of these disastrous storms arises in the Caribbean sea or the Bay of Yucatan and comes sweeping down on the coasts of Louisiana, Texas, Alabama and other Southern states when they are totally unprepared for it, causing tremendous damage to the warehouse and shipping interests and costing many valuable lives. Several times strong efforts have been made to interest Mexico in these stations and the United States has made a proposition to pay half the cost of the establishment and maintenance of stations and the telegraph wires. However, the Mexican government has not yet been brought to see the benefit that would accrue from the system and has rejected all the advances made. Under such discouragements the weather officials set out to find a new solution, and finally found one in the present one along the state at convenient distance of the Jesuit missionary stations. Advances were made to the order and now negotiations have progressed so far as to give assurance to the officials of the bureau that by the time the next storm season arises the system will be in such good order that they will be able to trace the course and manifestations of each individual storm and be in a position to give full notice to the shipping interests along the gulf coast.

OBSERVATIONS ON THE GREAT LAKES.

The lake marine section of the forecast division weather bureau in the last monthly bulletin states that reports have been received from the captains of 63 vessels navigating the Great Lakes. The following miscellaneous items are extracted from their reports:

Capt. Wm. Thorne, steamship Northern Star, 30th, aurora seen while off White Fish Point; first seen at 10:30 p. m. and continued for about one hour.

Capt. J. L. Weeks, steamship City of Genoa, 7th, buoy out of place in Sault River; 30th, Duck Island, Sault River, red buoy gone.

Capt. E. T. Rattray, steamship Specular, 9 p. m., 7th, to 3 a. m., 8th, northern lights in northern Lake Michigan.

Capt. W. S. Hoag, barge 130, 1st, eastern Lake Superior, northern lights.

Capt. F. A. Graves, steamship Matoa, 2d, Middle Island, northern lights.

Capt. Donald McLean, steamship City of Duluth, 7th, southeast Lake Superior, northern lights.

Capt. D. Q. Bordeaux, steamship H. J. Jewett, 7th, Straits of Mackinac, northern lights.

Capt. G. B. Mallory, steamship Mariposa, 30th, eastern Lake Superior, northern lights from 9:30 to 11 p. m.

Capt. H. Zealand, steamship Simon Langell, 1st, western Lake Superior, northern lights.

Capt. Thos. Hackett, steamship Volunteer, 5th, Lake Erie, northern lights; also 7th, in St. Clair River, northern lights.

Capt. R. J. Cowley, steamship Roumania, 7th, brilliant aurora, near Mackinac Island.

Capt. W. P. Garden, steamship Tioga, 1st, southern Lake Michigan, northern lights.

REPORTS FROM U. S. LIFE-SAVING STATIONS.

Through the co-operation of the general superintendent of the life-saving service and the secretary of the treasury, the weather bureau has received monthly reports for the month of June from the keepers of 33 U. S. Life-Saving Stations on the Great Lakes.

OBITUARY.

(CAPT. THOMAS HARBOTTLE.)

Capt. Thomas Harbottle, steamboat inspector for the port of Toronto, passed away suddenly on Friday afternoon.

While in an ante-room at the custom house, Capt. Harbottle was seized with a fit. He was alone at the time, but was found later by Capt. J. R. Heakes, who at once summoned assistance, and within a few minutes a medical man was in attendance, but the Captain never regained consciousness. Heart failure was stated by the physician to have been the cause of death. Capt. Harbottle had always enjoyed robust health, and only five minutes prior to his demise had been smoking and conversing in his office with the boiler inspector.

He was born in England in 1824, and early developed a love for the sea. He commanded the Princess Royal and Passport, plying between Montreal and Toronto, but after quitting the latter vessel resided in Hamilton for fifteen years. For some years he acted as captain of the Chicora, but in 1883 he was appointed to the position which he occupied at the time of his death. He was a practical mariner, and had an unlimited knowledge of nautical matters.

The deceased gentleman leaves a widow and seven sons and three daughters. The sons inciude Capt. James, of the Chicora; Capt. Thomas, of the steam barge Havanna; Capt. Harry, who commands a whaleback; George, purser of the Carmona; C. C. Harbottle and Neville, purser of the Cibola.

HEAVY INSURANCE LOSSES.

Marine underwriters are growing anxious over the long list of losses during October. The almost continuous gales which have prevailed this month have caused losses already said to reach about $300,000.

INLAND NAVIGATION.

The small steamer Berwick cleared from Chicago this week for Morgan City, La. She is owned by Capt. R. C. Brittain and managed by Capt. W. G. Edgecomb, of Saugatuck. Both are aboard. They go from Chicago down the Illinois & Michigan canal to the Illinois River, down the Illinois River to the Mississippi River, thence to Red River, up Red River to Athachafalo River to Grand Lake and then to Morgan City. They expect to be about twenty days making the trip. There is a party of six aboard. This is the first cruise for the Berwick to take.

A NEW CHICAGO ELEVATOR.

The fight between the board of trade elevator combine and miscellaneous grain receivers at Chicago, which had been temporarily declared off has been re-opened. Application has been made to the secretary of state for a charter for the Chicago Steel Grain Elevator Co., with a capital of $1,500,000. The stock has been subscribed by about a hundred members of the board in the grain receiving and shipping branch of the business, and it is the purpose of the company to begin at once the construction of a steel elevator on the Calumet River, with a storage capacity of 1,000,000 bushels.

NOTICE TO MARINERS.

Notice is hereby given that the color of the tower at Milwaukee Pierhead Light Station, Wis., has been changed from white to gray, and that of the fog signal houses from white to brown.

By order of the Light-House Board.

COMMANDER J. H. DAYTON,
Inspector 9th Light-House District.

LAKE HURON, MICHIGAN.—Presque Isle harbor wreck buoy, third class can, red and black horizontal stripes, marking an old wreck lying just north of the range line marked by Presque Isle harbor range lights, was discontinued September 12, as the remains of the wreck have been removed.

TO IMPROVE THE ERIE CANAL.

At a meeting of the friends of the canals, held in New York on Friday afternoon, the following were elected as a canal campaign committee: Alfred Romer, president Produce Exchange, chairman; George Clinton, of Buffalo, George B. Sloan, of Oswego; William E. Cleary, Louis Windmuller and Alex. R. Smith, of New York, all members of the executive committee of the canal committee of commercial associations, and F. B. Thurber, of New York, and F. S. Gardner, of the New York Board of Trade and Transportation, both representing the union for the improvement of the canals, and appointed as a sub-committee to act with the canal executive committee. Upon motion of Mr. Clinton, the following resolution was unanimously adopted:

"RESOLVED, That this body heartily endorses the proposed amendment to the Constitution giving the legislature power by the consent of the people to improve the canals, to the end that their existence and efficiency may be perpetuated, and urge the electors of the State to support that amendment without regard to party."

THE NEW REVENUE CUTTER.

The boarding cutter Calumet, built in Buffalo for the Chicago station, will be commanded by First Lieutenant John Dennett, who is now in Boston on duty in connection with the life saving service. Lieut. Dennett is described as an officer of marked ability. The principal duties of the officer in charge of the Calumet will be to see that the rules of the treasury department relating to the anchorage and movement of vessels in the harbor of Chicago are observed, and if occasion arises, force may be used to remove from the channel or fairway any vessel found violating the rules. The anchorage grounds are those heretofore laid down by the department, and are supposed to be familiar to all mariners. The Calumet will see to it that vessels are not anchored within 100 feet of any government pier or breakwater, except in emergencies caused by stress of weather. The commanding officer, by the regulations, is given authority to remove from her anchorage any vessel not anchored within the limits prescribed; to require, when he may deem it advisable, vessels to moor head and stern; to assign vessels to such part of the anchorage grounds as is suitable to their draft; to assume such general direction of the movement of vessels in the inshore channels as shall least obstruct navigation, and to see that the acts of congress prohibiting dumping of solids into the navigable waters of the United States are complied with and enforced.

THE NIAGARA WATER POWER.

Engineers have estimated that the total water power of Niagara Falls is 7,000,000 horse power. This estimate, to be sure, is in the main only a guess, but when the area drained into the lakes above Lake Ontario, and passing through the Niagara River be considered, the guess or estimate does not seem to be too large. The water surface of the Great Lakes above Ontario is 84,000 square miles, and the water-shed of these lakes is 240,000 square miles—more than twice the area of Great Britain and Ireland.

An article in the last issue of *Harper's Weekly* states that the total length of shore-line is 5,000 miles, while the volume of water is 6,000 cubic miles, of which Lake Superior contains almost one-half. The rate of outflow at Buffalo is from 217,000 to 275,000 cubic feet per second, while the fall at the cataract is 165 feet. The volume of water in the lakes is such that it has been estimated that even if no rain fell the flow of the river would be continued at its present rate for 100 years—that is, if the lakes could be gradually drained.

These are very large figures, but in the main they are the results of exact measurements. The small water powers in the world are uneven, and are affected by floods and droughts, but this great power at Niagara is as constant as anything in this world can be, not even the ice in the severest and longest winter ever known appreciably changing it. The present plant is intended only to utilize 125,000 horse power, and the turbines now in place are only for a small part of this. Other turbine wheels will be put in place as the demand for the power grows.

The general plan of the company contemplates the ultimate use of 450,000 horse power on the American side and a like amount in Canada. Such a power would turn all the wheels within a radius of 500 miles of the Falls. At the present time a considerable part of the power developed is to be taken to Buffalo by electric transmission, and it is the confident expectation of the electricians now at work on the problem that the power can be taken as far east as Albany, 300 miles away, and delivered there cheaper than power can be generated by burning coal. If this be so, then all the country between Albany and the Falls will be admirably adapted for manufacturing, while the Erie Canal will afford cheap and tolerably quick transportation, for there seems to be little difficulty in the way of hauling these boats by electrical power.

LARGE COAL SHIPMENTS.

The receipts of coal during the past week at the head of the lakes, were much more active than for any previous week during the past month. The Ohio Coal Co. had 21 boats loaded with coal on the way from Lake Erie ports last Monday. Nearly all of the companies have been forced to work night and day during the week. Of the 1,100,000 tons of coal received at the head of the lakes thus far this season, Superior received 780,000 and Duluth 330,000 tons.

TO DAM NIAGARA.

The committee on navigation of the Cleveland Chamber of Commerce, consisting of Capt. C. E. Benham, chairman, and Messrs. H. G. Dalton, H. D. Goulder and A. L. Stone, in submitting a report to the Chamber relative to lake levels, stated in part as follows:

"The idea of raising the waters of Lakes Erie, Huron and Michigan, or at least maintaining their level to high water mark by means of a submerged dam thrown across the Niagara River at some point below navigation, is not a new one. It has been discussed in the past and the plan has had many warm defenders, and, candor compels us to say, some able opposition. At present its greatest champion is Mr. George M. Wisner, an accomplished civil engineer of Detroit. If the plan be feasible, and from all we can learn we are disposed to think it is, there can be no question that by maintaining the mean water level to the present high water mark, hundreds of thousands of dollars would be saved the general government and advantages accrue to the commerce of the lakes of incalculable value. It would make the 20-foot channel a finality, would give increased depth to our harbors and rivers, and as the attempt would be simply to maintain high water level, it is not evident what damage could ensue. The cost of such a dam would be in the neighborhood of $600,000. Knowing the views of thoroughly competent engineers, we are heartily in favor of the appointment of an international commission of engineers, representing both this and the Canadian government, whose duties shall be to investigate the question thoroughly and report on its feasibility and the results that would attend a successful consummation in the saving to the respective governments of large annual appropriations.

"The plan is far from being chimerical, and it is not impossible that if undertaken the result may be a repetition of the Hay Lake channel experience. For years a subject of doubt as to its usefulness, even after its completion dubbed a failure, to-day the consent is unanimous that no improvement on the lakes will prove so beneficial as this same channel, and the engineering corps of the army, and especially Gen. O. M. Poe, are entitled to all the praise which comes from the accomplishment of a great purpose in the face of adverse criticism.

"Such a commission ought also to make careful computations of the amount of water passing over Niagara in a unit of time. Two computations have been made, one of 265,000 gallons per minute and another of 236,000 gallons per minute. All doubt should be removed as to the actual fact, since correct data on this point are absolutely essential, not only in considering the project of a dam above the falls, but for coming to correct judgments when deliberating on such matters as the Toronto deep waterway convention at this present time has in hand."

A NEW VALKYRIE.

It may now be taken for granted that Designer Watson has the lines all out for a cup challenger for 1895. On reliable authority the statement that Lord Dunraven decided that his first Valkyrie, which measured seventy feet on the water line—the ship with which he challenged three years ago—was hardly large enough for his all-around purposes; consequently his idea was to challenge this year with an 80-footer. He held strongly to this notion until a little more than a month ago when he learned that Fife had an order for a boat over 90 feet and that James Gordon Bennett's new boat would also turn out to be a 90-footer. In the latter event he saw but little chance for an 80-footer to win the New York cup and being bound by his own precedent, which allowed all American boats available for the defence of the cup to be counted in again, he wisely decided to go the limit and build a 90-footer, thus asking no favors of the New York Yacht Club as to the length.

Work on the boat will commence at once and the challenge may be sent a little ahead of the official required time. Watson will say nothing about this new order except that she will no doubt be across and sail for the cup. It goes without question that as in the case of the Thistle, an attempt will be made to build her in secret.

In building a 90-footer Lord Dunraven has gone to the limit of the new deed of gift and consequently need have no fear of existing boats.

BUILDING MORE WHALEBACKS.

The *Evening Telegram*, of Superior, Wis., has the following to say relative to the "whaleback" shipyard at that point:

"It begins to look like old times at the shipyard of the American Steel Barge Co. in this city. The clang, clang of the hammer and the hum of machinery denotes to the visitor, as he approaches the yard, that this great arena of industrial activity is again counted among the live and progressive institutions of this city. For the past month new men have been gradually put at work till now they number more than one hundred and those who are in a position to know say that a much greater number will be employed there this winter. The report was circulated from an Eastern city that the barge company for the next few years will devote its attention to making money with its already large fleet instead of putting forth any great amount of tonnage. This may be true in a measure, but it is a matter of fact that one large steamer is now in course of construction and it is no secret that the company contemplates building others this winter. This question will be definitely settled one way or the other at a meeting to be held in this city next month.

The officials of the company will not offer the slightest encouragement for the statement that they will do anything until it has been formally decided upon, no matter how well they might know in their own minds that certain action will be taken. This characteristic is especially true when they are questioned for publication. But the best of plans are bound to leak information sooner or later and it is learned upon reports that emanate from reliable sources that the barge company has a number of important projects in view.

Among these is the construction of at least one more vessel for its fleet, in addition to the one now on the stocks and the construction for other parties of at least two more. It is possible, therefore, that a few months may witness a general resumption of this great shipyard. All of this, if realized, will cause increased activity at the steel plant in the manufacture of ship plate and other material and appliances necessary in ship building. It is certain that the indications now point to a realization of the rumored plans of the barge company."

THE VIKING SHIP.

The Viking ship, which last year crossed the Atlantic to be one of the most attractive exhibits at the World's Fair, has been formally presented to the Field Columbian Museum. The exercises attendant upon the presentation were participated in by some of the most prominent Norwegians of Chicago. The speech of the day was delivered by Paul du Chaillu, the famous traveler and author. Addresses were also made by J. K. Boysen and Nicolay Groestad, of Chicago.

AMPLITUDES.

The following approximate amplitudes of the Sun's rising will be given each week in this column during the season of navigation: A second bearing of the Sun may be taken at sunset by reversing the bearings to read west instead of east, as, for example, E. by S. for a sunrise bearing would read W. by S. for a sunset, or E. 16° S. to W. 16° S.

LAKE ERIE AND S. END LAKE MICHIGAN LAT. 42° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Oct. 19	E. 14° S.	E. by S. ¼ S.
Oct. 25	E. 16° S.	E. by S. ⅜ S.

LAKE ONTARIO, S. END HURON AND CENTER LAKE MICHIGAN LAT. 44° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Oct. 19	E. 14° S.	E. by S. ¼ S.
Oct. 25	E. 17° S.	E. by S. ½ S.

N. END LAKES HURON AND MICHIGAN, LAT. 46° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Oct. 19	E. 14° S.	E. by S. ¼ S.
Oct. 25	E. 17° S.	E. by S. ½ S.

LAKE SUPERIOR LAT. 48° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Oct. 19	E. 15° S.	E. by S. ⅜ S.
Oct. 25	E. 18° S.	E. by S. ⅝ S.

With a compass correct magnetic, the difference between the observed and true bearings will be the variation for the locality. If there is any deviation on the course the vessel is heading at the time of taking the bearing the result after the variation is applied will be the amount of deviation on that course.

DULUTH FLOUR MILLS.

The Imperial mill at Duluth made a record last week which probably exceeds that of any single mill in the world for the same length of time. The output for twenty-four hours was 6,520 barrels. The Imperial mill has held the record for the head of the lakes, but the recent milling was about 300 barrels better than has ever been done here before.

A reduction of the output to the acreage of wheat gives a clearer idea of the day's product. It takes about four and a half bushels of wheat to make a barrel of flour, or for the whole product of the day's run 29,340 bushels were required. At an average yield of 15 bushels per acre, it would take 1,956 acres, or about six ordinary sized Minnesota farms if they were sowed all to wheat, to produce the wheat ground in twenty-four hours in the Imperial mill.

The value of the wheat ground into flour was about $17,017. To obtain the value of the output the wages of the men employed in the mill and the profit to the manfacturers must be added.

BIDS FOR REMOVING OBSTRUCTIONS.

The bids for the removal of boulders and other materials from the channel in the vicinity of Ballard's Reef, in the Detroit River, were opened on Friday last by Gen. O. M. Poe, at Detroit. The bids were ten in number and provided for furnishing all labor, material and appliances. The wide divergence in the bids was something remarkable, the highest being $10 per cubic foot for boulders and 35c. per cubic foot for other material. The entire list and their figures were as follows:

Carkin, Stickney & Cram, Milwaukee, boulders, 87c., other materials, 87c.

Breymann Bros., Toledo, boulders $3.50; other material 98c.

James Rooney, Toledo, boulders, $6.50; other materials, 39c.

L. J. and J. A. Smith, Cleveland, boulders, $10; other materials, 35c.

R. J. Cram, Detroit, boulders, $3.50; other materials, 98c.

Hingston & Wood, Buffalo, boulders, $8.50; other materirls, 49c.

Dunbar & Sullivan, Buffalo, boulders, 98c., other materials, 98c.

C. H Starke, Milwaukee, boulders, $8.80; other materials, 30c.

Wm. May, Detroit, boulders, $4.88; other materials, 7c.

Townsend & Johnson, Somers Point, N. J., boulders, $8.25; no figures on other materials.

COST, INSURANCE, FREIGHT.

The letters c. i. f. are an abreviation for the words "cost, insurance, freight." When used in a contract of sale they import that the price named therein is all the buyer will be required to pay for the goods themselves, for transporting them to his market or to some other place named in the contract, and for insuring them during such transportation. The buyer must pay the consular charges and all others not strictly included under cost of goods, freight or insurance. This, at least, is the rule in the absence of a custom extending the meaning of the terms. If it is the universal practice in any trade to include consular or other charges under the term c. i. f. any contract made by those engaged in that trade will be subject to this custom.

LAKE SUPERIOR WATER LEVELS.

The rise and fall of the water levels on Lake Superior has been the subject of considerable discussion, and many are the theories advanced to account for the sudden changes in levels. The *Northwestern Miller* dismisses the subject with the opinion that the recent phenomena was due to a strong nor'easter, which is probably as correct as any of the scientific reasons heretofore suggested. In its current number it says:

"The running of mills and elevators was greatly interfered with last week by high water, which forced shutdowns until it subsided. The rise was clearly due to the strong nor'easter which came off Lake Superior. The theory so often advanced that these miniature floods come from heavy rains which swell the streams which empty into the head of the lakes, is false, as all the water that could possibly pour down the St. Louis River, and other smaller streams, into the head of the lakes bays, would find an immediate outlet to the lakes through the Superior and Duluth entries. Singularly enough, however, both the rise and fall of water last spring and that last week were accompanied by quite heavy rains. The water of Lake Superior, and, of course, at the head of the lakes and the "Soo," has averaged ten to twelve inches higher this season than last, contrary to the theory that the biggest inland lakes were slowly being drained over the Niagara Falls, and a few inches of water added by local causes easily brings the surface above a point calculated upon when industries were built along the harbor front. The John M. Nichol, which was moored in the harbor at Duluth Tuesday, was raised one and a half feet alongside the dock, which indicates to a degree what a strong nor'easter can do with the head-of-the-lakes harbor.

"TORPEDO scissors," a new form of torpedo net cutter invented by a Danish naval officer, proved highly successful in a recent test. They are fixed to the head of the torpedo and fall apart on striking the net, cutting it so as to let the torpedo fall through and strike the ship.

WILLIAM L. BROWN, President.

WALTER F. COBB, Vice President and Treasurer.

W. I. BABCOCK, Manager.
O. R. SINCLAIR, Secretary and Asst. Treas.

Chicago Ship Building Company,

STEEL STEAM-SHIP BUILDERS.

101st Street and Calumet River.

LONG DISTANCE TELEPHONES:
SHIP YARD OFFICE, "SOUTH CHICAGO 40."
CHICAGO OFFICE, 1013 ROOKERY, "MAIN 3447."

SOUTH CHICAGO, ILL.

Mannheim Insurance Company,

OF MANNHEIM, GERMANY.

CAPITAL, $2,000,000 ASSETS, $3,078,538.22
Deposited in the U. S., $350,000

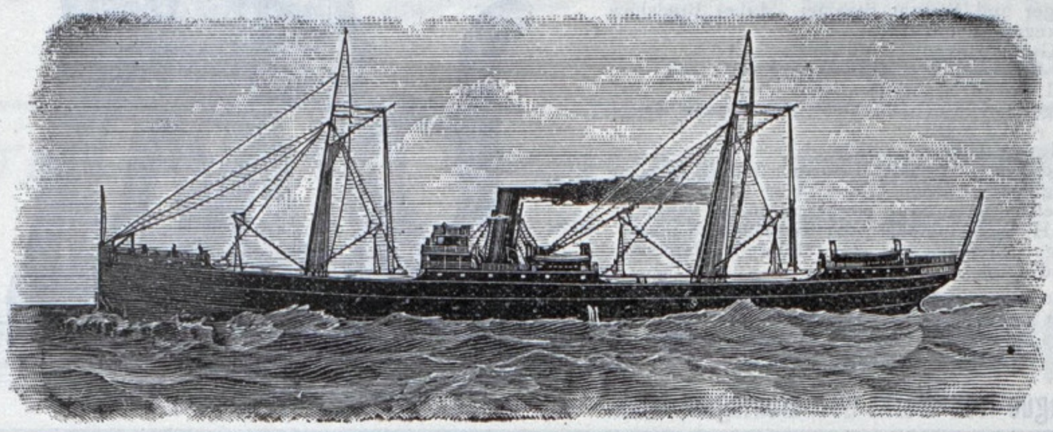
UNITED STATES MANAGER:
Jas. Johnstone Riley, - - New York.

Insures Hulls, Freights and Cargoes.

Marine and Inland Department.

HENDERSON BROTHERS,
General Western Agents,
176 Jackson Street, Chicago, Ill.

F. W. WHEELER & COMPANY.,



BUILDERS OF ALL KINDS OF

IRON, STEEL AND WOODEN SHIPS,

FOR LAKE OR OCEAN SERVICE.

West Bay City, Mich.

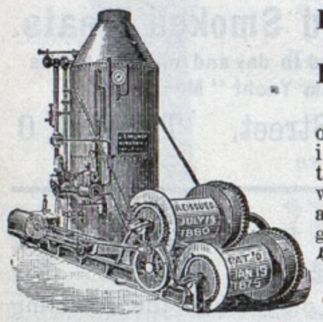
F. W. WHEELER, Prest. E. T. CARRINGTON, Vice-Prest.
F. L. GILBERT, Secretary.

FRONTIER IRON WORKS,

MARINE ENGINES,

DETROIT, MICH.

Hoisting, Mining, Bridge Erecting,



Dock Build'g, Pile Driving, Coal Hoisting and Quarry Engines

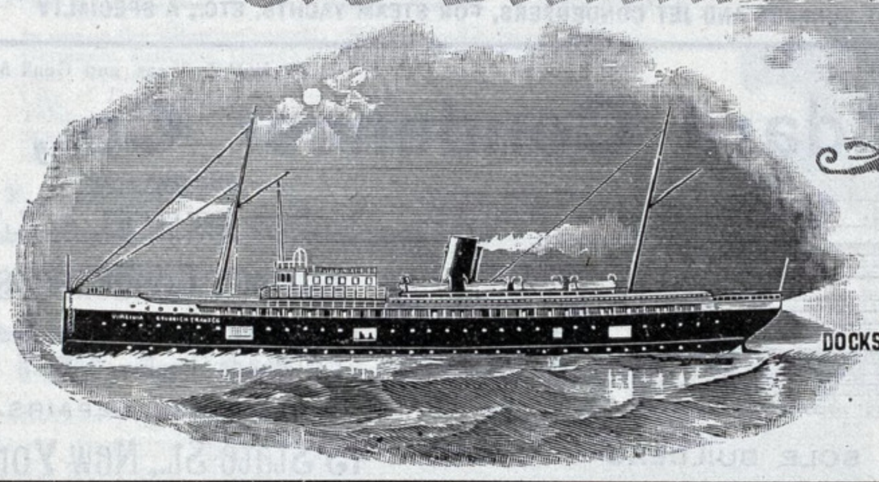
of any power, with my improved Patent Friction Drums, with or without Boilers. Any amount of reference given. Established 1870.

Send for Catalogue.

J. S. MUNDY,
Newark, N. J.

1741 Market St., Philadelphia, Pa.
22 Light St., Baltimore, Md.
117 Water St., Pittsburgh, Pa.
249 South Jefferson St., Chicago, Ill.
715 North Second St., St. Louis, Mo.
39 Magazine St., New Orleans, La.
34 Fremont St., San Francisco, Cal.
85 Front St., Portland, Oregon.
Fourth & Wakouta Sts., St. Paul, Minn.
218 Congress St., Boston, Mass.

O. S. Richardson Fueling Co.



COAL

DOCKS { FOOT OF NORTH MARKET ST.
18TH STREET BRIDGE.
ILLINOIS CENTRAL SLIP "C."

Office, 54 LaSalle Street,

CHICAGO.

INCORPORATED 1794.

Insurance Company of North America.

CAPITAL, Paid up in Cash, - - $3,000,000.00
ASSETS, - - - - - - - 9,432,249.80

CHARLES PLATT, President. WILLIAM A. PLATT, Vice-President.
EUGENE L. ELLISON, 2nd Vice-President. GREVILLE E. FRYER, Sec'y & Treas.
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department.

GEORGE L. McCURDY, Manager,
CHICAGO, ILLS.

MARINE AND INLAND INSURANCE.

ATLANTIC MUTUAL INSURANCE COMPANY,

(ORGANIZED 1842.) Office, 51 Wall Street, NEW YORK.

Insures against Marine and Inland Transportation Risks and Issue Policies making Loss Payable in England.

Assets over $10,000,000 for the Security of its Policies.

The profits of the Company revert to the assured, and are divided annually upon the premiums terminated during the year; thereby reducing the cost of insurance. For such dividends, certificates are issued bearing interest until ordered to be redeemed, in accordance with the charter.

J. D. JONES, Prest. W. H. H. MOORE, Vice-Prest. A. A. RAVEN, 2nd Vice-Prest. J. H. CHAPMAN, Secy.

BUCYRUS Steam Shovel AND Dredge Company,

South Milwaukee, Wis.

STEAM SHOVELS AND DREDGES

For all Purposes.

CAPITAL $300,000.

The Marine Bank Company,

Incorporated in 1891 under State Law. CLEVELAND, OHIO.

Successors to E. B. HALE & CO., established in 1852.

DIRECTORS:

W. H. BARRISS, President. H. C. RANNEY, Vice-President. W. B. HALE, Cashier.
C. E. BURKE. THOS. FITZPATRICK. THOS. H. WHITE. MARTYN BOWNELL

Would be pleased to meet or correspond with any one whose present Banking relations are not entirely satisfactory, or who, for any reason, propose to open a new account.

We promise to make every effort to make our Bank a safe, agreeable and profitable place to do business.

Beginning Sunday, October 7th, a Palace Buffet Sleeping Car Service will be inaugurated between Chicago and New York City via the Nickel Plate Road and Delaware, Lackawanna & Western R. R. This in no way changes the former Through Car Arrangement. 160

Improved Bolt Helmet.

ESTABLISHED, 1844.

A. SCHRADER & SON

Manufacturers of

Submarine Armor

AND

Diving Apparatus.

32 ROSE ST., N. Y

FRANKLIN HOUSE

Cor. Bates & Larned sts., only a block from Woodward & Jefferson aves., DETROIT, MICH. THOROUGHLY RENOVATED. Very central. Per day, $1 50. H. H. JAMES.

PATENTS

Promptly secured. Trade-Marks, Copyrights and Labels registered. Twenty-five years experience. We report whether patent can be secured or not, free of charge. Our fee not due until patent is allowed. 32 page Book Free. H. B. WILLSON & CO., Attorneys at Law, Opp. U. S. Pat. Office. WASHINGTON, D. C.

The Nickel Plate Road now operates a Through Sleeping Car Service to New York City via West Shore Road, and after October 7th a Daily Buffet Sleeping Car Service will be inaugurated via Delaware, Lackawanna & Western. R R. 161

AMERICAN LINE.

For Queenstown and Liverpool.

The only Trans-Atlantic Line sailing under the American Flag. Sailing every Wednesday from Philadelphia and Liverpool, and extra sailing on alternate Saturdays.

LORD GOUGH, August 16, 12:30 p. m.
OHIO, August 23, 6:30 a. m.

For rates of passage and other information, apply to

The International Navigation Company,

Nos. 305 and 307 Walnut St.,

PHILADELPHIA.

If you are interested in

ADVERTISING,

you ought to be a subscriber to PRINTERS' INK; a journal for advertisers.

PRINTERS' INK is issued weekly, and is filled with contributions and helpful suggestions from the brightest minds in the advertising business.

PRINTERS' INK costs only two dollars a year. A sample copy will be sent on receipt of five cents.

ADDRESS

PRINTERS' INK,

10 SPRUCE STREET, - NEW YORK.

THE MARINE RECORD IS THE NAME WE WOULD ASK YOU TO REMEMBER WHEN YOU ARE READY TO SUPPLY THE TRADE OF THE LAKES

ESTABLISHED 1871. INCORPORATED 1893.

MONTAGUE IRON WORKS CO.,

MANUFACTURERS OF

Marine and Stationary Engines

AND BOILERS OF ALL KINDS.

MONTAGUE, MICH.

Heavy Castings a Specialty. Prices Quoted on Application.

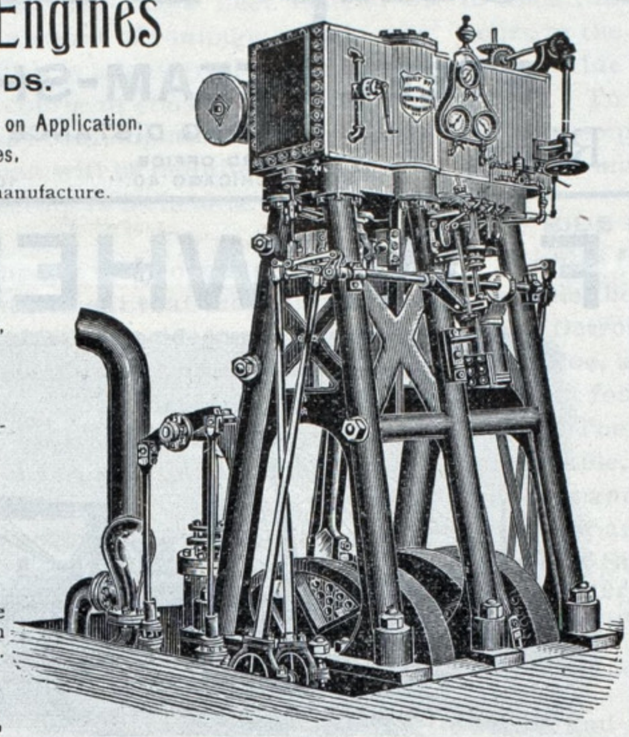
Fore and Aft Compound Marine Engines.

The Engines in the ollowing boats are of our manufacture.

Edward Buckley, Manistee, 18 and 36x30.
Sachem, Grand Haven, 21 and 38x36.
Charles A. Street, Chicago, 20 and 36x36.
Isabella J. Boyce, Michigan City, 19 and 32x26.
M. T. Greene, Chicago, 20 and 36x36.
Passenger and Freight Steamer, Mabel Bradshaw, Muskegon, 16 and 28x26.
Ionia, Grand Haven, 24 and 46x42.
Survey Steamer, W. S. Hancock, 12 and 21x20.
Mark B. Covell, Manistee, 18 and 30x26.
Passenger and Frieght Steamer, Bon Voyage, Saugatuck, 16 and 30x26.
Tug, Hunter, Chicago, 15 and 28x22.
Tug, Edward G. Crosby, Muskegon, 16 and 30x24.
Oval Agitator, Chicago, 14 and 28x20.
Tug, Peter Coates, Sault Ste Marie, 10 and 20x16.
Luella H. Worthington, Cedar River, 19 and 36x30.
Passenger Steamer, E. G. Maxwell, Pentwate 14 and 28x20.

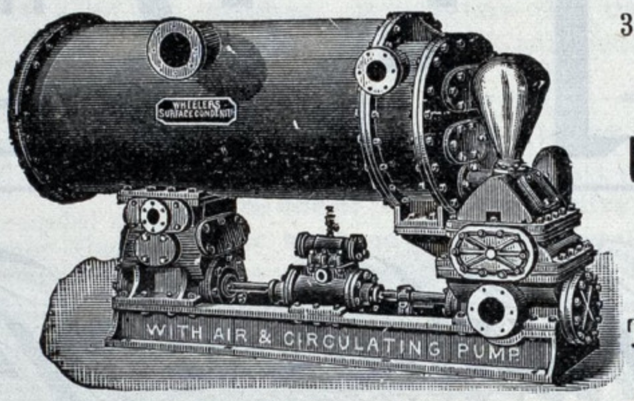
The engraving represents our 20 and 36x36 Fore and Aft Compound Marine Engine. We build them all sizes and guarantee them to give satisfaction.

Prices furnished on application.



Montague Iron Works Co., Montague, Mich.

WHEELER CONDENSER AND ENGINEERING CO.



39 & 41 Cortlandt St., NEW YORK

Proprietors and Manufacturers of

WHEELER'S IMPROVED

Patent SURFACE CONDENSERS

ALSO THE

Wheeler "Admiralty" Condenser,

WITH PATENT SCREW GLANDS.

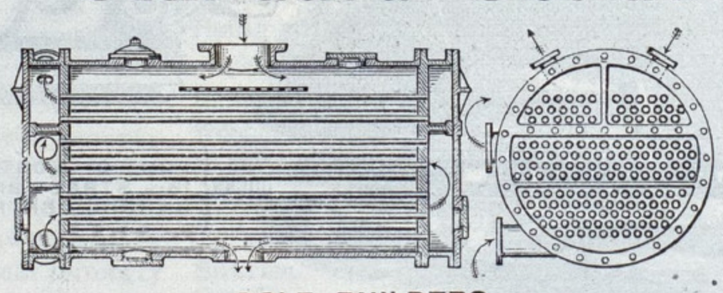
The Wheeler-Lighthall Condenser

With Patent Waterproof Packing.

LIGHT WEIGHT SURFACE AND JET CONDENSERS, FOR STEAM YACHTS, ETC., A SPECIALTY

F. P. BUDDEN, President. W. E. VOLZ, Treas. and Gen'l Mgr.

Standard Condenser Co.,



SOLE BUILDERS

Patent Combined Surface Condenser and Feed Water Heater.

BUILDERS OF

LIGHTHALL

Surface Condensers,

Tube Heads, Patent Brass Screw Glands, Packings, Etc.

CONDENSER REPAIRS.

15 State St., New York.

SEND FOR CIRCULAR.

STANDARD TECHNICAL BOOKS AND PERIODICALS.

Marine Engines and Dredging Machinery (Man), Illustrated by over 150 Steel Plates and 295 Wood Engravings, Showing the Engines of Leading Screw Steamships of England and Other Nations	$18.00
American Marine (W. W. Bates)	4.00
American Marine and the Marine Record	5.00
"Wrinkles" in Practical Navigation (Lecky)	6.00
"Wrinkles" in Practical Navigation and The Marine Record	7.00
Practical Seamanship (Todd & Whall)	6.50
Practical Seamanship (Todd & Whall) and The Marine Record	7.50
Treatise on Screw Propeller, Screw Vessels and Screw Engines, with The Marine Record	5.00
Steam Engine Catechism (Grimshaw)	2.00
Manual of Marine Engineering	5.00
Drawing and Rough Sketching for Marine Engineers (Donaldson)	2.50
Manual of the Steam Engine (Thurston) Part I	7.50
Manual of the Steam Engine (Thurston) Part II	7.50
Scott's Coast Pilot	1.50
Beeson's Inland Marine Guide, Special Edition for 1894	5.00
Great Lakes Register of Shipping	5.00
Dominion Admiralty Court Practice (Howell)	6.25
Law of Bills of Lading (Porter)	.....

Copies of any of the above Books or Periodicals, or any others relating to Steam Power or Shipbuilding, in any of their details, furnished at proportionately low rates by addressing

SMITH & SWAINSON, PUBLISHERS THE MARINE RECORD,
Leader Building, Cleveland, Ohio.

CENTRIFUGAL PUMPS for COAL,

SAND OR DREDGING.

Wrecking Pumps a Specialty.

SUPERIOR TO ANY OTHER

16,000 IN USE.

Our Water Ballast Pump will throw more water with less steam than any other. Photographs and estimates on application.

MORRIS MACHINE WORKS,

Baldwinsville, N. Y.

HENION & HUBBELL, Agents,

55 and 57 N. Clinton St., Chicago, Ill.

Good Thing for the Drummer.

The Big Four Route is in the field with another innovation which will prove a great boon to the Commercial Traveler. Under recent arrangements, Agents of this Company will accept mileage tickets in payment for excess baggage charges detaching sufficient coupons from mileage tickets at tw cents per mile to cover the excess baggage charges. This will be a great convenience to traveling men, and the fact that Big Four mileage tickets are good over a large number of connecting lines, will make their tickets more popular than ever with the traveling public. 41

E. G. ASHLEY,

CHOICE FAMILY GROCERIES.

ALSO ALL KINDS OF

Fresh, Salt and Smoked Meats.

Vessel orders attended to day and night. Goods delivered by Steam Yacht "Maggie D."

36 & 38 Summit Street, TOLEDO, O

A line of Through Palace Buffet Sleeping Cars between Chicago and New York City will be placed at the disposal of the traveling public and run over the Nickel Plate Road and D. L. & W. R. R. 162

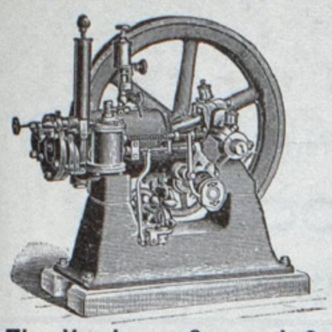
PROPOSALS.

U. S. ENGINEER OFFICE, 349 Carondelet St., New Orleans, La., September 28, 1894. Sealed proposals for extension of East Jetty and for dredging at Harbor of Sabine Pass, Tex., will be received here until 12 o'clock noon, October 29, 1894, and then publicly opened. Information furnished on application. JAMES B. QUINN, Major, Engineers. 40–43

U. S. ENGINEER OFFICE, 366 Milwaukee St., Milwaukee, Wis., October 1, 1894. Sealed proposals for: Green Bay Harbor, Wis., dredging 200,000 cubic yards; Kewaunee Harbor, Wis., pile pier extension 325 feet; Manitowoc Harbor, Wis., construction of breakwater 400 feet; Sheboygan Harbor, Wis., pile pier construction 900 feet, will be received here until 12 o'clock noon, November 1, 1894, and then publicly opened. All information furnished on application. JAMES F. GREGORY, Major, Engineers. 40–43

U. S. ENGINEER OFFICE, 366 Milwaukee St., Milwaukee, Wis., October 1, 1894. Sealed proposals for: Harbor of Refuge, Milwaukee, Wis., extending breakwater 300 feet; Racine Harbor, Wis., pier extension 150 feet; Kenosha Harbor, Wis., pier extension 150 feet; Waukegan Harbor, Ill., pile pier extension 240 feet, will be received here until 12 o'clock noon, November 6, 1894, and then publicly opened. All information furnished on application. JAMES F. GREGORY, Major, Engineers. 40–43

THE COMING POWER FOR ...BOATS...



If you are going to build a boat write for our catalogue and let us furnish the power.

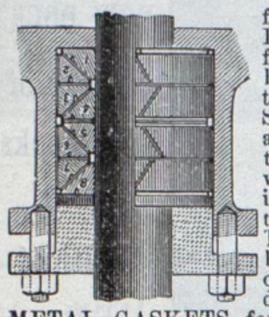
No coal, wood or steam.

No licensed captain, pilot, or engineer.

2 TO 60 HORSE POWER.

The Vanduzen Gas and Gasoline Engine Co.,
CINCINNATI, OHIO.

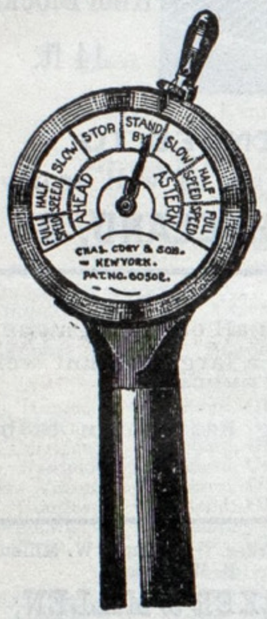
Katzenstein Self-Acting Metal Packing



for Piston Rods, Valve Stems, Etc., of every description, for Steam Engines, Pumps, Etc. Adopted and in use by the principal Iron Works, Steamship Companies, Mills and Engine Builders, Electric Light and Power Plants within the last twelve years in this and foreign Countries. Also FLEXIBLE TUBULAR METALLIC PACKING for Slip-Joints on Steam Pipes and for Hydraulic Pressure. Also METAL GASKETS for all sizes and shapes of flanges. Double-Acting Balanced Water-tight Bulkhead Doors for Steamers. Also Agents for the McColl-Cumming Patent Liquid Rudder Brake.

L. KATZENSTEIN & CO., General Machinists, Brass Finishers and Engineers' Supplies, 357 West Street, New York, N.Y.

CHAS. CORY & SON



Manufacturers of the

Mechanical Marine Telegraph,

ELECTRIC CALL BELLS,

Engine Bells and Brass Work of all descriptions, Shrieking and Siren Whistles.

278 Division St., New York City.

A. J. MORSE & SON.

DIVING APPARATUS

140 CONGRESS ST. BOSTON.

PATENTS TRADE-MARKS, OPINIONS, Validity Searches, Etc., promptly attended to. Send Sketch or Model for Free Examination as to Patentability.

F. B. KEEFER,
Atlantic Building. WASHINGTON, D. C.

ROBERT E. HILLS,

TELEPHONE 3321.
STEAM FITTING and HEATING.
Wrought Iron Pipe & Fittings, Engineer's Supplies.
GENERAL JOBBING WORK DONE PROMPTLY.
Also Proprietor of North Side Iron Works.
57 & 59 North Wells St., CHICAGO, ILLS.

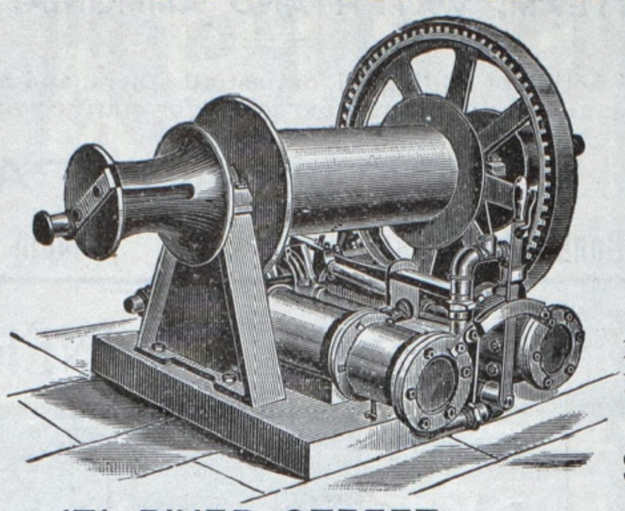
C. E. BENHAM,

MARINE GROCER
VESSEL SUPPLIES.
121 River St., Cleveland. O.

☞ Goods delivered to all parts of the city. Telephone 745. Detroit, Cleveland, Buffalo and Chicago papers always on hand.

T. R. TEARE. M. THOMAS.

RIVER MACHINE & BOILER WORKS



MARINE AND STATIONARY ENGINES, BOILERS, . . AND . . DECK HOISTING ENGINES.

Starting, Stopping, Reversing and Lowering all done by working one Lever.

SOLE AGENTS FOR
St. John's Self Adjusting Cylinder Packing.

171 RIVER STREET, CLEVELAND, O.

THE CHASE MACHINE COMPANY,

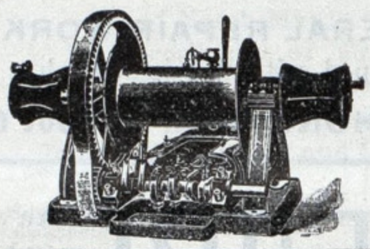
MACHINISTS, ENGINEERS AND BLACKSMITHS.

MANUFACTURERS OF

Land & Marine Engines & Steam Pumps,

SOLE OWNERS AND MANUFACTURERS OF THE
CHASE AUTOMATIC FOG WHISTLE MACHINE,
IN USE ON NEARLY ALL LAKE STEAMERS.
Agents for ASBESTOS STEAM, BOILER AND PIPE COVERING.

Telephone 994. 111 Elm Street, CLEVELAND, O.



JACKSON & CHURCH,

BUILDER OF DUPLEX HOISTING AND DECK ENGINES.

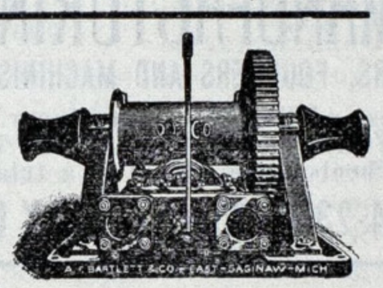
Plain Finished and Automatic **ENGINES,** From Heavy Patterns at Moderate Prices.

Vertical, Horizontal, Marine and Locomotive **BOILERS** Strictly First-Class and Highest Test.

SEND FOR CIRCULAR AND PRICES. SAGINAW, MICH.

BARTLETT DECK HOIST.

In use on the ollowing vessels: Steamers—Roumania, Bulgaria, Germanic, Brittanic, George G. Hadley, S. S. Wilhelm, Majestic, Alex. Nimick, John Harper, Walter Vail, Panther, City of Berlin, City of Paris, City of Glasgow, City of London. Schooners—Tokio, Asiatic, Baltic, Celtic, Aberdeen, William D. Becker. Stopping, Starting, Reversing and Lowering, all done by working one lever.

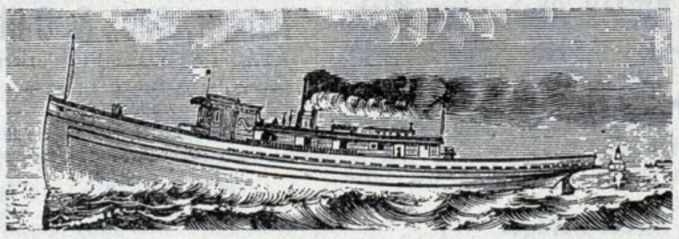


A. F. BARTLETT & CO., - East Saginaw, Mich.

H. A. HAWGOOD, Pres't. PHILIP MINCH, Vice-Pres't. GEO. ELSEY, JR., Gen'l Mang'r. J. A. SMITH, Sec'y. J. R. SPRANKLE, Treas.

The Cleveland Tug Company,

First-class Tugs, Steam Pumps, Divers, Hawsers, Lifting Screws, Etc., furnished Promptly on Orders by Telegraph or otherwise.



Steamers when outsidewanting our Tugs, blow one long whistle and as many short ones as they want tugs.

OFFICE, OPEN DAY AND NIGHT, EAST END MAIN ST. BRIDGE.

LONG DISTANCE TELEPHONE 919. *CLEVELAND, OHIO.*

J. H. OWEN, Prest., Chicago. F. H. VAN CLEVE, Sec'y, Escanaba. Capt. GEO. BARTLEY, Supt., Escanaba.

ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready.

TUG MONARCH—Engine Compound, Cylinder 16 & 30 in. diameter, 30 in. Stroke, Steam Pressure allowed, 125 lbs.
TUG DELTA—Cylinder 20 by 22. Steam Pressure allowed, 105 lbs.
TUG OWEN—Cylinder 20 by 20, Steam Pressure allowed, 104 lbs.

CENTRIFUGAL PUMPS. SEVEN AND FOURTEEN INCH SUCTION.

THE THOMPSON TUG AND WRECKING CO.,

OF PORT HURON.

Have the tugs Merick and Brockway, with lighter Clinton, fitted with McMyler's Improved Revolving Derrick for quick hoisting, stationed at Sault Ste Marie, Mich., ready to do all kinds of wrecking and raft towing.

Address CAPT. ROBERT P. THOMPSON, Sault Ste Marie, Mich.

Tug Chas. D. Thompson, tug building, engine 17 x 36 x 30, are stationed at Port Huron, and are fitted out with a complete wrecking outfit, ready to do all kinds of wrecking and raft towing.

Address LYNN & THOMPSON, Port Huron, Mich.

MECHANICS

TAUGHT BY MAIL 4500 STUDENTS

DIPLOMAS AWARDED. Courses in other trades, all including thorough instruction in Mathematics and Physics. Send for FREE Circular stating subject you wish to study to **The Correspondence School of Mechanics, Scranton, Pa.**

ERIE, PA.

Best Harbor for Repairs while Vessels are loading.

PENNSYLVANIA BRASS WORKS,
12th and State Streets.
BRASS CASTINGS,
Whistles, Water Gauges, Gauge Glasses, Valves.

MARINE ENGINEERS.

Drawing and Rough Sketching for Marine Engineers, with proportions, instructions, explanations, and

EXAMPLES.

Also how to design Engines, Boilers, Propellers, Paddle-wheels, Shafts, Rods, Valves, etc.; and information useful as a reference to those concerned in the construction of Marine Machinery, by

JAMES DONALDSON.

Price $2.50, Post-paid. MARINE RECORD OFFICE.

Walter V. Metcalf

Submarine Diver.
Wrecking, Drilling, Blasting, Searching and general
Submarine Work
Carried out Promptly.
ADDRESS
V. O. TUG OFFICE,
MAIN ST. BRIDGE,
CLEVELAND, O.

P. M. CHURCH & CO.,

SAULT STE. MARIE, MICH.
SHIP CHANDLERY, HARDWARE.
PAINTS, OILS, AND ALL CLASSES OF
VESSEL SUPPLIES.
Coppersmith Shop in connection.
Corner Portage and Ashmun Sts.
TELEPHONES, - { OFFICE No. 7. RESIDENCE No. 4.

A. GILMORE & SONS

TOLEDO DRY DOCK.
Telephone No. 157, TOLEDO, OHIO.
Vessels Docked and Repaired at Reasonable Rates.

Scott's New Coast Pilot,

FOR THE LAKES.
New Edition for 1894.
For sale by Ship Chandlers and Booksellers, and by the Publishers, at 115 Bal Ave., Detroit, Mich.

CRANDALL'S PATENT PACKINGS,

FOR STEAM, WATER AND AMMONIA.

Not having been subjected to the injurious chemical action of boiling oil, outlast all others, and never melt and gum. We are constantly displacing other packings on Lake and Ocean Steamers, and can guarantee our goods for marine work. Ask the man offering "the same thing" to explain his process. He boils his goods in oil.

Send for Descriptive Catalogue and Samples.

CRANDALL PACKING CO.

New York, 136 Liberty Street. Chicago, 51 S. Canal Street. Main Offices and Works, PALMYRA, N. Y.

Y SHOULD PAY U

$85.00 for an Indicator when you can get either of these for $40.00, packed in finest cases, finest workmanship, finest material, and the **best** designs.

Send for circular of Reducing Wheels, Planimeters, Three-Way Cocks and 25 other high grade specialties.

HINE & ROBERTSON CO.,
Cortlandt St., New York.

FROST "IMPROVED" STEAM PUMPS

FOR EVERY POSSIBLE SERVICE.

RELIABLE AND DURABLE.

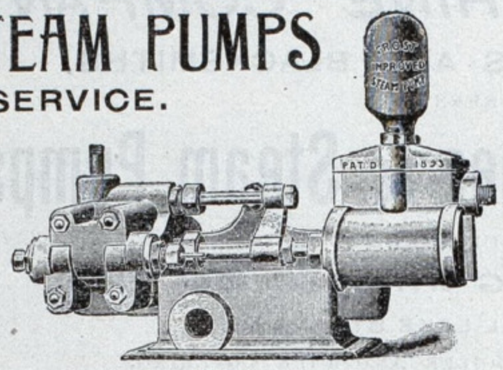
NO OUTSIDE VALVE GEAR.

MANUFACTURED BY

MANISTEE IRON WORKS COMPANY,

MANISTEE, MICH.

SEND FOR CATALOGUE AND PRICES.

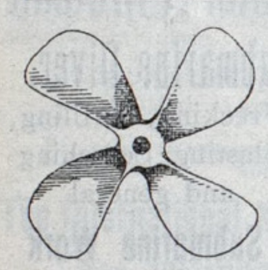


Paint your Vessels with **L. S. G. Graphite Paint.**

NO BLISTERING, CRACKING OR SCALING.

Made especially for Stacks, Decks, Sides, Hulls and Water Compartments.
Strictly anti-rust, and most durable and economical.

DETROIT GRAPHITE MFG. CO. 542 River St., Detroit, Mich.



McKINNON MANUFACTURING CO.,

BOILER MAKERS, FOUNDERS AND MACHINISTS,

Marine Boilers, Engines and Ship-yard Machinery. Most Powerful set of Hydraulic Slings on the Lakes. Best Towing and Speed Propeller Wheels made. Send us a trial order.

Works and Office, 224-230 N. Water St., BAY CITY, MICH.

SWAIN WRECKING CO.,

Tugs { FAVORITE AND SAGINAW.

Telegraph { PARKER & MILLEN, Detroit, Mich. Capt. M. SWAIN, Cheboygan, Mich.

THE CUDDY-MULLEN COAL COMPANY

DEALERS IN COAL.

Docks at Government Pier, Whiskey Island, and Adjoining Globe Dry Dock.

All fully equipped with Revolving Dercicks; also, Lighter Carrying Derrick, and One Hundred Two and One-Half Ton Buckets.

Main Office, 81 Perkins Building, East Side of Main Street Bridge.
Dock Office, 127 West River St., Cleveland, Ohio. Telephone No. 8.

Boats Coaled Day and Night. Docks at Amherstburg and Sandwich, Ontario

---

MULLEN-GATFIELD COAL CO.,

Dealers in the Celebrated

MANSFIELD AND YOUGHIOGHENY COALS.

Docks at SANDWICH, ONTARIO, opposite the Fort at Detroit, with chutes for rapid fueling. Elevated docks and derrick at AMHERSTBURG, ONTARIO.

Established at Baldwinsville, 1861. Removed to Syracuse, 1881.

The Baldwinsville Centrifugal Pump.

The oldest, best and cheapest Centrifugal Pump in the market.

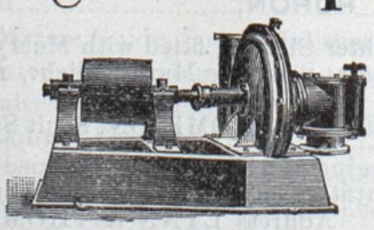
Capacity for 100 to 40,000 Gallons per Minute.

All sizes up to 12 in. delivery, in stock.

Address for catalogue and prices.

IRVIN VAN WIE, MANUFACTURER,

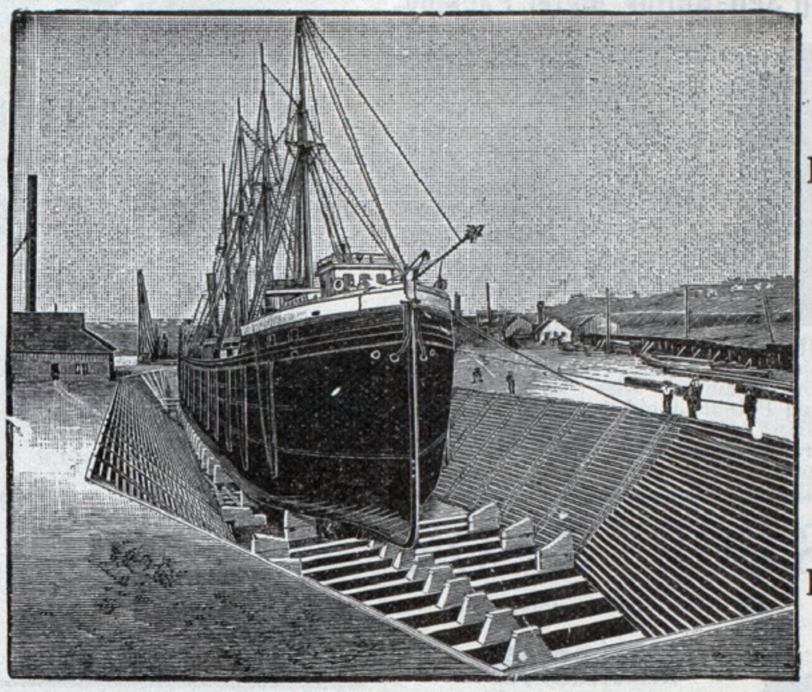
48-50 South West Street, Syracuse, N. Y.



SAND PUMPS A SPECIALTY.

THE SHIP OWNERS DRY DOCK CO.

OLD DOCK		NEW DOCK
Length of Keel Blocks		Length of Keel Blocks
340 ft.		300 ft.
Width of Gate		Width of Gate
50 ft.		52 ft.
Depth of Water on Keel Blocks		Depth of Water on Keel Blocks
16 ft.		14 ft.



GENERAL REPAIR WORK PROMPTLY ATTENDED TO.

Being equipped with Lucigen Lights we can do work at night as well as day.

TELEPHONE 1635. Foot of Weddell St., CLEVELAND, O.

CHEAP!

An article that requires a small outlay of money may be very expensive, while a large amount well placed might be economical.

Marine Record advertising has proven to be most economical.

ESTABLISHED 1857.

THOMAS MARKS & CO.,

Merchants, Forwarders and Ship Owners.

PORT ARTHUR, CANADA.

N. B.—Special attention given to chartering vessels.

Calvin Carr. G. C. Blair. John Mitchell.

CARR & BLAIR

VESSEL AND INSURANCE AGENTS,

Rooms 1 and 2. Tel. Main 869.

12 Sherman St. CHICAGO.

A. A. Parker. James W. Millen. B. W. Parker.

PARKER & MILLEN,

Vessel & Insurance Agents.

Iron Ore & Coal Cargoes a Specialty.

Rooms 3 & 4 15 Atwater St., West.

DETROIT, MICH.

C. T. Palmer. H. W. Cook. Capt. J. A. Calbick.

Palmer, Cook & Calbick,

Vessel Agents and Underwriters,

108 and 109 Royal Insurance Bldg. Chicago, Ill.

Telephone, Harrison 698.

J. G. Keith. D. Sullivan.

J. G. KEITH & CO.

VESSEL AND INSURANCE AGENTS,

140 and 141 Rialto Bldg. CHICAGO.

Telephone No. 3658.

JOHN PRINDIVILLE,

VESSEL AND INSURANCE AGENT,

12 Sherman Street,

Telephone Main 129. CHICAGO.

C. A. MACDONALD & CO.,

GENERAL MARINE INSURANCE AGENTS.

RIALTO BUILDING, CHICAGO, ILL.

THOS. WILSON,

MANAGING OWNER WILSON'S TRANSIT LINE,

General Forwarder, Freight and Vessel Agent. CLEVELAND, O.

C. R. JONES & CO., VESSEL AGENTS

FIRE AND MARINE INSURANCE.

Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

JOHN MITCHELL. JOHN F. WEDOW. ALFRED MITCHELL.

MITCHELL & CO., Vessel and Insurance Agents,

Office Telephone, 767. 508-509-510 Perry-Payne Building,

Residence John Mitchell, 3506. CLEVELAND, O.

CAPT. ALEX. CLARK. JOHN C. FITZPATRICK.

A. CLARK & CO., Vessel and Insurance Agents.

TELEPHONE SENECA 892. NO. 60 MAIN STREET, BUFFALO, N. Y.